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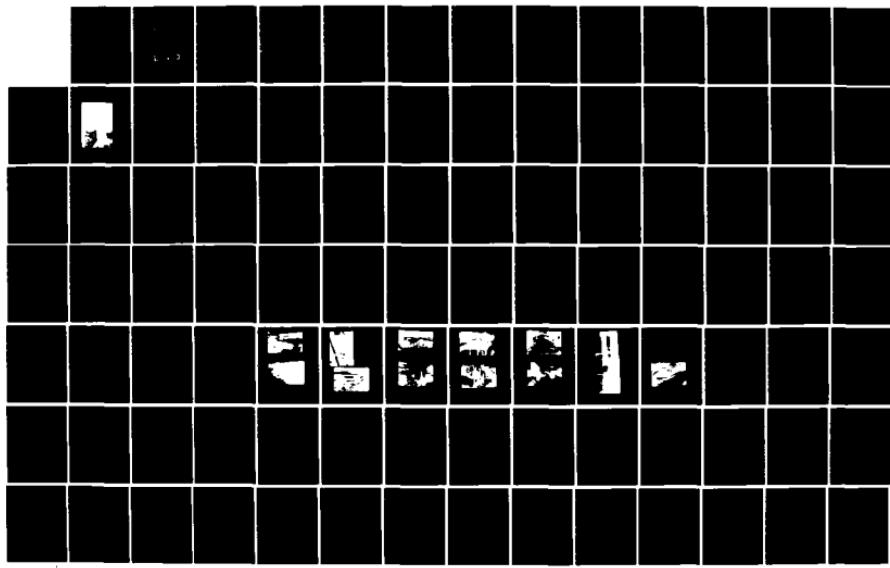
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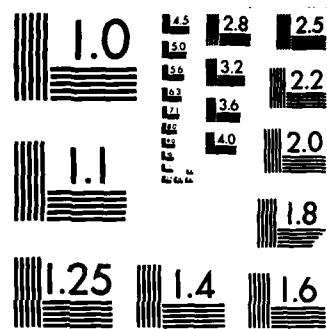
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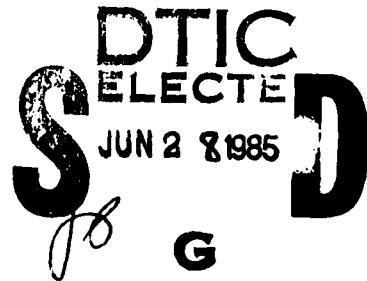
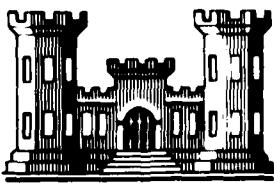
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AD-A155 796

PENOBCOT RIVER BASIN  
SEBEC, MAINE

SEBEC DAM  
ME 00163

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS. 02154

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JUNE, 1981

INSTRUCTION STATEMENT A
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ME 00163	2. GOVT ACCESSION NO. A153 796	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Sebec Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS	5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT	
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION	6. PERFORMING ORG. REPORT NUMBER	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254	12. REPORT DATE June 1981	
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Penobscot River Basin Sebec Maine Sebec River		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The dam is about 276 ft. long with a height of 16 ft. The dam is considered to be in fair condition. Continued spalling and erosion of the gate structure concrete could eventually compromise its structural stability. It is large in size with a hazard classification of significant. It is recommended that the owner engage a qualified engineer to further assess the spalled and eroded concrete of the old power station and fishway,		

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DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION CORPS OF ENGINEERS  
424 TRAPELO ROAD  
WALTHAM, MASSACHUSETTS 02254

REPLY TO  
ATTENTION OF  
NEDED

AUG 07 1981

Honorable Joseph E. Brennan  
Governor of the State of Maine  
State Capitol  
Augusta, Maine 04330

Dear Governor Brennan:

Inclosed is a copy of the Sebec Dam (ME-00163) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Agriculture and to the owner, Bangor Hydro-Electric Company, Bangor, Maine. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Agriculture for your cooperation in this program.

Sincerely,

C. E. EDGAR, III  
Colonel, Corps of Engineers  
Commander and Division Engineer

Incl  
As stated



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PENOBCOT RIVER BASIN

SEBEC DAM

ME 00163

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASSACHUSETTS 02154

FEBRUARY, 1981

LETTER OF TRANSMITTAL  
FROM THE CORPS OF ENGINEERS TO THE STATE  
TO BE SUPPLIED BY THE CORPS OF ENGINEERS

BRIEF ASSESSMENT  
PHASE I INSPECTION REPORT  
NATIONAL PROGRAM OF INSPECTION OF DAMS

Identification Number: ME00163  
Name of Dam: SEBEC DAM  
Town: SEBEC  
County and State: PISCATAQUIS COUNTY, MAINE  
Stream: SEBEC RIVER  
Date of Inspection: NOVEMBER, 1980

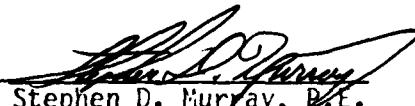
The dam, constructed prior to 1882, is a rock-filled timber crib structure, capped and liberally reinforced with concrete, approximately 276 feet long and 16 feet in height. The structure includes a 20-foot long abutment section on the left, a 178-foot spillway section, a 20-foot fish passage to the right of the spillway, and a 58-foot structure which forms the right abutment and contains two outlet sluice gates. The spillway is divided into two sections, 58 feet being 1 foot higher than the remaining 120 feet. Upstream and downstream faces of the dam are vertical. The two manually operated sluice gates are 11 feet wide by 10 feet high and are reported operable.

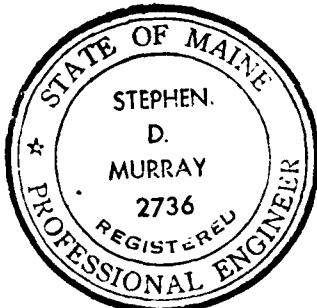
The dam impounds Sebec Lake and is on the Sebec River approximately 9.2 miles upstream of its confluence with the Piscataquis River. It is used for water storage and flow regulation for downriver hydro-electric facilities, and seasonally for maintenance of lake level. The lake is about 11.5 miles long with a surface area of approximately 6,800 acres. Storage capacity to the top of the dam is estimated at 150,000 acre-feet.

Based upon the visual inspection and the review of available data regarding this facility, the dam is considered to be in Fair condition. Continued spalling and erosion of the gate structure concrete could eventually compromise its structural stability.

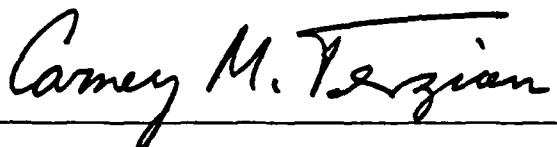
In accordance with the Corps of Engineers Guidelines and the size (LARGE) and hazard (SIGNIFICANT) classification of the dam, the Test Flood selected was equivalent to the Probable Maximum Flood (PMF). Peak inflow to the reservoir is 85,000 cfs; routed peak outflow from the dam is 43,000 cfs with the water elevation 26.5 feet above the dam crest. The spillway capacity is 9,400 cfs, (13,300 cfs w/o flashboards) which is equivalent to approximately 22% (31% w/o flashboards) of the routed Test Flood outflow from the dam. Hydraulic computations indicate that outflow in excess of approximately 15,000 cfs will be controlled by downstream channel characteristics rather than the dam, thus spillway capacity, with flashboards in place, is about 63% of the maximum outflow controlled by the dam. Without flashboards, the spillway capacity is 89% of the maximum outflow.

It is recommended that the owner engage a qualified, registered engineer to further assess the spalled and eroded concrete of the old power station and fishway (gate structure) and submit recommendations for repair and rehabilitation. This and the remedial measures which are discussed in Section 7 should be instituted within one year of the owner's receipt of this report.

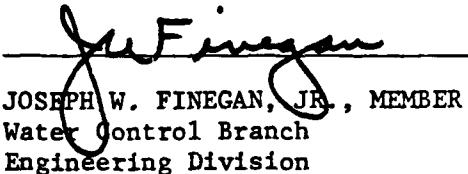
  
Stephen D. Murray, P.E.  
Project Manager  
James W. Sewall Company



This Phase I Inspection Report on Sebec Dam (ME-00163) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.



CARNEY M. TERZIAN, MEMBER  
Design Branch  
Engineering Division



JOSEPH W. FINEGAN, JR., MEMBER  
Water Control Branch  
Engineering Division



ARAMAST MAHTESIAN, CHAIRMAN  
Geotechnical Engineering Branch  
Engineering Division

APPROVAL RECOMMENDED:



JOE B. FRYAR  
Chief, Engineering Division

## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

a. General - At the time of inspection on November 4, 1980, the water level in Sebec Lake, impounded by the dam, was 7 inches over the lower spillway section, with flashboards installed. The weather was cloudy and cool. The general condition of this dam is fair.

b. Dam - This is basically a timber crib, rock filled dam with concrete renovations and additions. The timbers have been capped with concrete to produce the spillway crest and apron as shown in Photos 1 and 2. As seen in Photo 2, there is a moderate amount of leakage from between some of the timbers of the crib. This was not considered indicative of any structural deficiency. Bedrock is exposed in the area of the right abutment as shown in Photo 3. The left abutment, shown in Photo 4, is concrete enclosed by steel sheet piling. Both the piling and the concrete abutment are in good condition. A stone riprapped slope goes from this abutment for some 30 yards upstream to the stub abutment of a highway bridge. This riprap is in good condition and extends up the slope to 3 feet above the water level on the day of inspection.

On the right side of the dam, as shown in Photo 5, is a concrete intake channel and forebay leading to the substructure of a former power station. The concrete walls of the forebay are in good condition. On the left side of the forebay adjacent to the old power station, as shown in Photo 6, a new steel passage was added in 1978. This has not been completed and there are no current plans to complete it. A concrete training wall leads upstream on the right side of the forebay to the other abutment of the highway bridge. This training wall is of recent construction and is in good condition.

### c. Appurtenant Structures

Spillway - The concrete cap forming the spillway crest and apron is in good condition with only a few small cracks and minor erosion. The timbers underneath were inaccessible for inspection.

Outlet Structure - The outlet structure is of reinforced concrete and is the substructure of a power station which burned on August 19, 1940. Two sluice gates were installed in 1960 for the two 10'x11' openings at the downstream end of the forebay, as shown in Photo 7. These gates are lifted and controlled by a trolley type manual chain hoist hung from a steel frame above the gates. The hoist and gates are reported operable. It is reported that there are generally no problems with icing of the gates during the winter. Occasionally it has been necessary to steam the gates free. There are no remaining turbines or other equipment to impede the flow of water under the powerhouse floor. As shown in the left side of Photo 8, the water exits through two 10'x10' openings in the downstream foundation wall of the power station. The concrete of this structure is still essentially sound but many surfaces are badly spalled and eroded as seen in Photo 7 and 8. Where the surface has not yet spalled, there are numerous efflorescent stains as seen in Photo 6.

The detailed engineering data required to perform an in-depth stability analysis of the dam was not available. The final assessment of the dam, therefore, must be based primarily on visual inspection, performance history, and spillway capacity computations.

c. Validity - A comparison of records, data, and visual observations reveals no significant discrepancies, other than those noted above, between design and as-built dimensions.

## SECTION 2: ENGINEERING DATA

### 2.1 DESIGN

a. Available Data - Available data consists of the following plans by the Bangor Hydro-Electric Company, Bangor, Maine:

1. Sebec Dam, General Plan, January 23, 1961, Dwg. M-2061
2. Sebec Dam, General Plan, Nov. 19, 1975, Dwg. M-2001A
3. Sebec Lake Dam, Proposed Concrete Forebay, Aug. 29, 1977, Dwg. 3092
4. Sebec Lake Dam, Proposed Concrete Forebay, Changes to Accommodate Fishway, September 1, 1978, Dwg. 3092A

Also available was the General Plan and Elevation of Sebec Plant for Milo Light and Power Co., Sanders Engineering Co., Portland, Me., Dec. 13, 1920.

b. Design Features - The drawings, computations and inspection reports indicate the design features stated in Section 1.

c. Design Data - Design data consists of information on the drawings listed in "Available Data" and the information shown in Appendix B.

### 2.2 CONSTRUCTION

a. Available Data - Information as contained in any plans, drawings, or specifications previously listed in "Design Data" or Appendix B.

b. Construction Considerations - Since no original plans of the dam were available, there was no practical means to ascertain any construction changes. Post-construction changes are discussed in Section 6.3.

### 2.3 OPERATION

Pond level readings are taken irregularly, but as frequently as needed, to guide the operational procedures described in Section 4.1.

### 2.4 EVALUATION

a. Availability - Existing data was provided by the Bangor Hydro-Electric Co. and the Maine Office of Energy Resources.

b. Adequacy - Detailed hydrologic/hydraulic data were not available. Design data and field measurements were utilized in conjunction with New England Division - Army Corps of Engineers "Preliminary Guidance for Estimating Maximum Probable Discharges" to perform the computations of outflow capacity.

i. Spillway

1. Type:	overflow
2. Length of weir:	178 ft
3. Crest el.	
with flashboards	323
without flashboards 120 ft.	321.2
without flashboards 58 ft.	322.2
4. Gates:	N/A
5. Upstream channel:	natural stream
6. Downstream channel:	natural stream
7. General:	N/A

j. Regulating Outlets

1. Invert:	309
2. Size:	two 11 ft.-wide by 10-ft. high sluice gates
3. Description:	steel wheeled gates installed over old powerhouse intakes
4. Control mechanism	gates are operated by trolley-type chain hoist
5. Other:	4-ft. wide fish passage at right side of dam with wood stoplogs

e. Storage

1. Normal pool:	95,000 acre-ft
2. Flood control pool:	N/A
3. Spillway crest pool:	82,000 acre-ft
4. Top of dam:	150,000 acre-ft
5. Test flood pool:	258,000 acre-ft

f. Reservoir Surface

1. Normal pool:	6,800 acres
2. Flood control pool:	N/A
3. Spillway crest:	6,800 acres <u>±</u>
4. Test flood pool:	7,400 acres <u>±</u>
5. Top of dam:	7,000 acres <u>±</u>

g. Dam

1. Type:	rock-filled crib
2. Length:	276 ft <u>±</u>
3. Height:	21 ft <u>±</u>
4. Top Width:	10 ft <u>±</u>
5. Side Slopes:	vertical
6. Zoning:	N/A
7. Impervious Core:	N/A
8. Cutoff:	steel sheeting
9. Grout Curtain:	N/A
10. Other:	N/A

h. Diversion and Regulating Tunnel N/A

6. Gated spillway capacity at test flood el. 347.5	N/A
7. Total spillway capacity at test flood el. 347.5	30,400 cfs w/flashboards 31,100 cfs w/o flashboards
8. Total project discharge at top of dam el. 330.4 (controlled by tailwater)	15,000 cfs
9. Total project discharge at test flood el. 347.5 (controlled by tailwater)	43,000 cfs

c. Elevation (Feet, NGVD)

1. Streambed at toe of dam:	309 <u>+</u>
2. Bottom of cutoff:	N/A
3. Maximum tailwater:	unknown
4. Recreation pool:	323
5. Full flood control pool:	N/A
6. Spillway crest (Ungated):	
with flashboards	323
without flashboards - 120 ft.	321.2
without flashboards - 58 ft.	322.2
7. Design surcharge (original design):	N/A
8. Top of dam:	330.4
9. Test flood surcharge:	347.5

d. Reservoir

1. Length of normal pool:	11.5 mi
2. Length of flood control pool:	N/A
3. Length of spillway crest pool:	11.5 mi
4. Length of pool at top of dam:	11.5 mi
5. Length of test flood pool:	11.5 mi <u>+</u>

g. Purpose of Dam - Original purpose was water power, then hydro-electric generation. Currently used for water storage and flow regulation.

h. Design and Construction History - The timber crib rock-filled dam was built prior to 1882 to operate a saw mill. In about 1920, a stone masonry and concrete dam with power station was constructed by Boston Excelsior Company of Milo, Maine, about 100 feet downstream of the timber crib structure. The new dam reportedly failed as it was being filled, and the older timber crib structure was subsequently renovated and used, with the new powerhouse, for power generation. The power station was operated by Boston Excelsior and subsequent owners until it burned on August 19, 1940. The dam was later acquired by Bangor Hydro-Electric Company and has, over approximately the last 20 years, received considerable maintenance attention including concrete capping, steel sheeting and new sluice gates.

i. Normal Operational Procedures - Flow from the dam is controlled as necessary to supplement Piscataquis River flows at the Howland hydro-electric station downstream. An ancillary procedure is to release water as required during low flow periods to supply the intake to the Milo Water District. In addition, an effort is made to maintain Sebec Lake at approximate flashboard crest from July 1 to September 1 in deference to the Sebec Camp Owners Association.

### 1.3 PERTINENT DATA

a. Drainage Area - 327 square miles of flat and moderately rolling wooded terrain.

b. Discharge at Dam Site - Discharge is from over the spillway and through the two sluice gates. Elevations shown below are in feet referenced to NGVD datum.

#### 1. Outlet Works (conduits):

Two 11-ft. wide by 10-ft. high sluice gates w/water at dam top el. 330.4	6,400 cfs (total, both gates).
--	--------------------------------

#### 2. Maximum known flood at dam site:

March 20, 1936	11,400 cfs
----------------	------------

3. Ungated spillway capacity at top of dam el. 330.4	9,400 cfs w/flashboards 13,300 cfs w/o flashboards
--	---

4. Ungated spillway capacity at test flood el. 347.5 (controlled by tailwater)	30,400 cfs w/flashboards 31,100 cfs w/o flashboards
---	--

5. Gated spillway capacity at normal pool el. 323	N/A
---	-----

The left abutment has a top elevation of 325.0, a maximum of 16 feet in height above the streambed.

58 feet of the spillway has a crest elevation of about 322.2, while the remaining 120 feet is 1 foot lower. The entire spillway is normally operated at an elevation of about 323.0 using permanent flashboards.

The gate structure and right abutment (old powerhouse) has a top elevation of 330.4 and contains two 11-foot wide by 10-foot high steel wheeled sluice gates, both at an invert elevation of 309.1. Mounted above each gate is a steel hoist framework constructed to support a trolley-type lifting apparatus. Access to the gate structure is via the right embankment.

Elevations are in feet referenced to NGVD datum.

No instrumentation exists at this dam. There is a USGS stream gaging station on the Sebec River approximately 1,000 feet downstream of the dam.

c. Size Classification - **LARGE** - The dam impounds approximately 150,000 acre-feet with the pond level at the top of the dam, which at elevation 330.4 is about 21 feet above the streambed. According to the Recommended Guidelines, the dam is classified as large in size since its impoundment is greater than 50,000 acre-feet.

d. Hazard Classification - **SIGNIFICANT** - If the dam were to be breached, there is potential for considerable downstream damage and possible loss of a few lives. Two or three seasonally occupied structures approximately 3.8 miles downstream of the dam would be flooded to a depth of about 1 foot by the sudden 2-foot increase in stage from 5 to 7 feet above the streambed.

A breach under dry weather conditions would result in a sudden 10-foot increase in stage immediately downstream of the dam, from 5 to 15 feet. This would flood two seasonally occupied structures approximately 400 yards downstream of the dam to a depth of about 4 feet.

e. Ownership - Bangor Hydro-Electric Company  
33 State Street  
Bangor, Maine 04401  
Attn: Mr. Douglas Morrell  
(207)945-5621

f. Operator - Mr. Merle Doyer  
Bangor Hydro-Electric Company  
West Main Street  
Milo, Maine 04463  
(207)943-7371

PHASE I INSPECTION REPORT  
SECTION 1 - PROJECT INFORMATION

**1.1 GENERAL**

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. James W. Sewall Company has been retained by the New England Division to inspect and report on selected dams in the State of Maine. Authorization and notice to proceed were issued to James W. Sewall Company under a letter of April 2, 1980 from William E. Hodgson, Jr. Colonel, Corps of Engineers. Contract No. DACH 33-80-C-0051 has been assigned by the Corps of Engineers for this work.

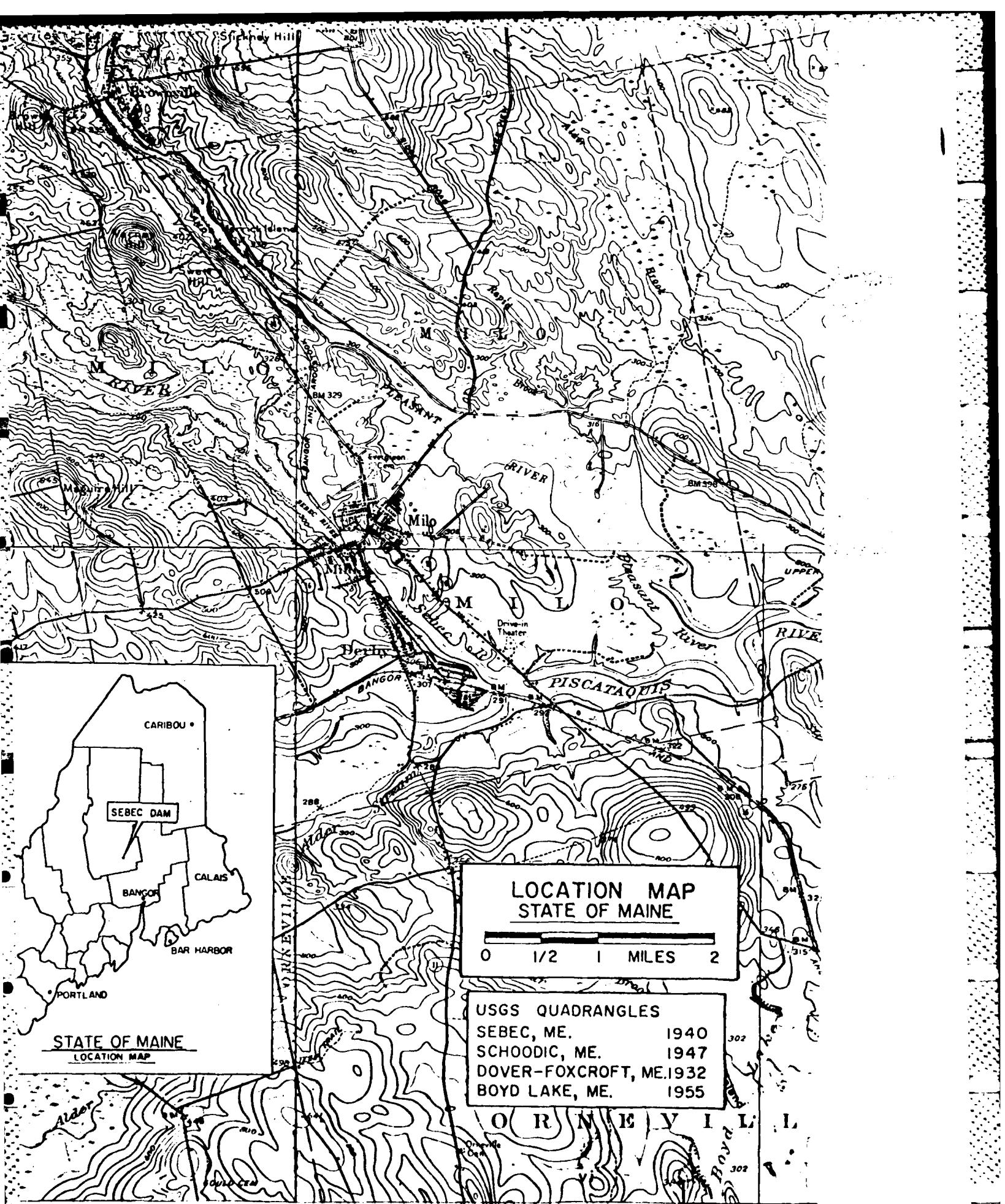
b. Purpose of Inspection Program - The purposes of the program are to:

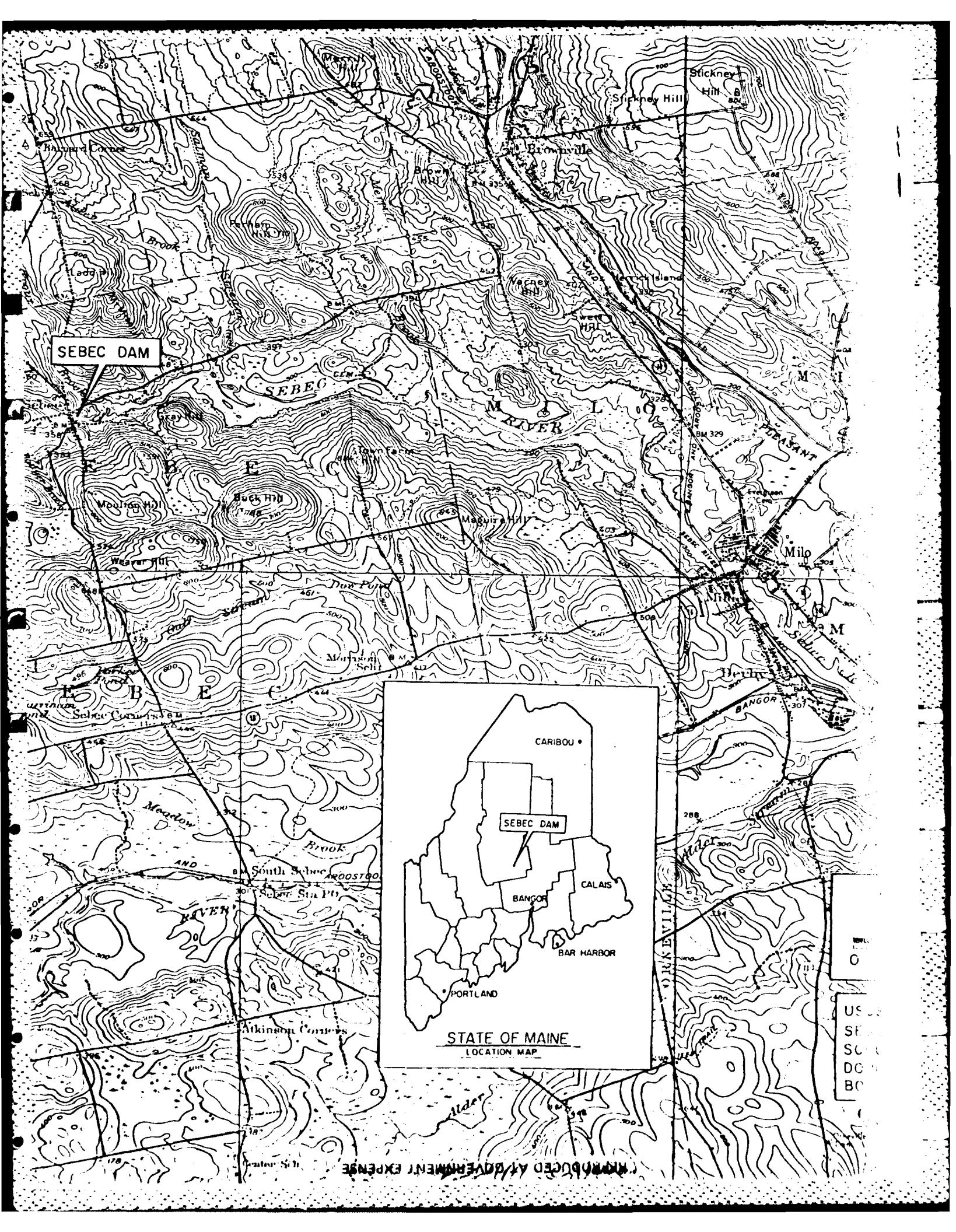
1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.
2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
3. To update, verify and complete the National Inventory of Dams.

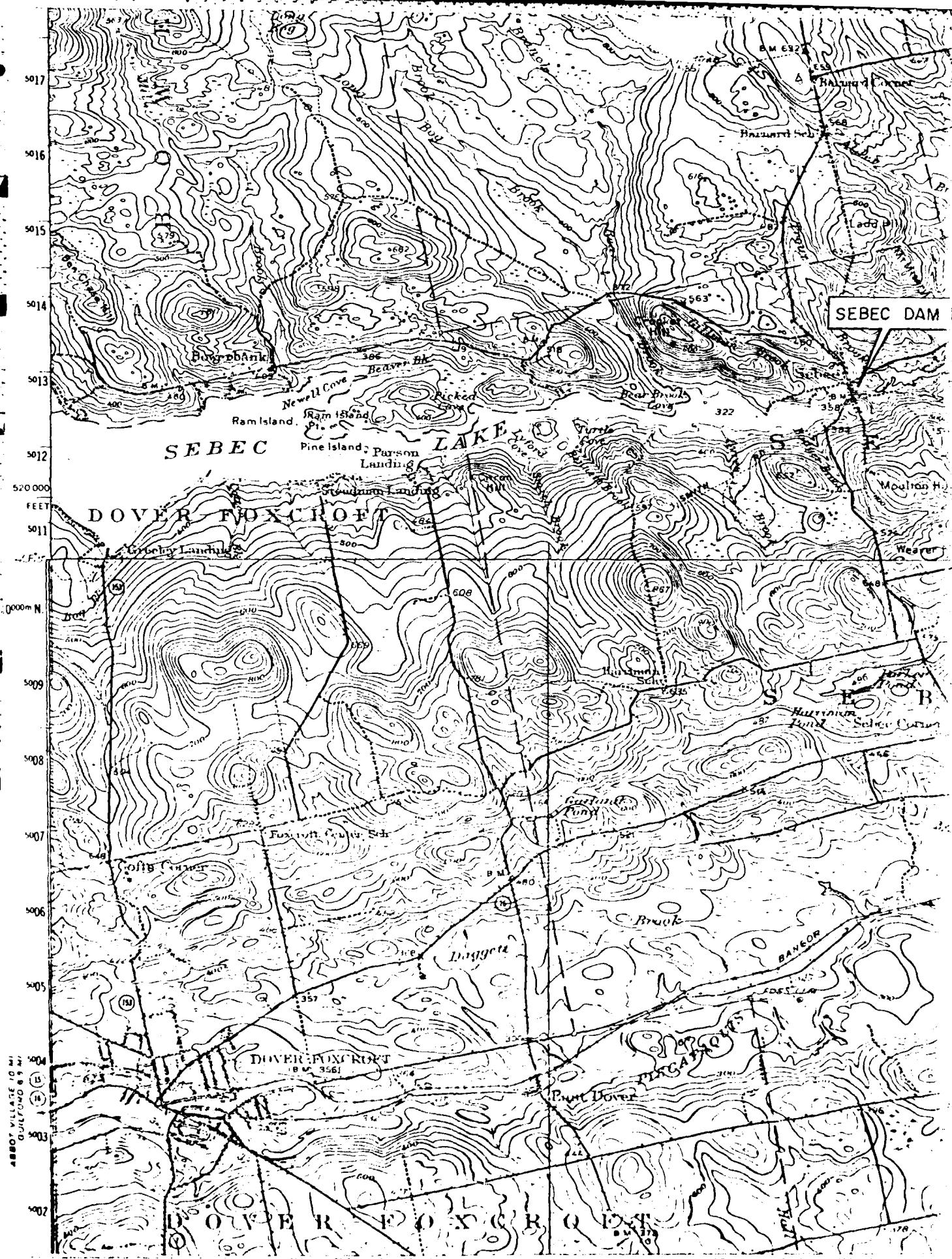
**1.2 DESCRIPTION OF PROJECT**

a. Location - The dam is located on the headwaters of the Sebec River about 9.2 miles upstream from its confluence with the Piscataquis River in the Town of Sebec, County of Piscataquis, State of Maine. The dam is shown on the Sebec, Me. USGS Quadrangle Map having coordinates latitude N45°16.2' and longitude W69°07.0'.

b. Description of Dam and Appurtenances - The existing dam, founded on bedrock, is a roughly "Z" shaped concrete-capped timber crib structure, 276 feet in overall length, including a 20-foot long abutment section on the left, a 178-foot spillway section, a 20-foot long fish passage on the right, and the 58-foot long foundation of a now-defunct hydro-electric generating station, containing two outlet sluice gates, which forms the right abutment.







REPRODUCED AT GOVERNMENT EXPENSE



OVERVIEW PHOTO

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Sebec Dam - ME 00163 Sebec, Maine February 1, 1981
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		

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#### APPENDIX

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d. Reservoir Area - There are no indications of instability along the banks of the reservoir in the vicinity of the dam. The reservoir is only 50 yards wide where it is spanned by the highway bridge 30 yards upstream of the dam. Continuing upstream, Sebec Lake gradually widens to its maximum width of two miles which occurs near the upper end of its eleven mile length.

e. Downstream Channel - At the left of the old power station is an abandoned concrete fishway which also serves as a training wall below the power station, as seen on the right side of Photo 8. This concrete has moderate spalling and some efflorescence. Extending about 25 yards from the lower end of the fishway is an earth filled, stone masonry wall separating the tailrace from the main river channel as shown in Photo 9. This wall is about 10 feet wide and 8 feet high with numerous small trees growing on it. This wall is in good condition. The main downstream channel is the original riverbed, as seen in Photo 9. This is stony with areas of exposed bedrock. The banks of the river are wooded.

The first crossing of the Sebec River downstream of this dam is the Bangor and Aroostook Railroad Bridge in Milo. This is about seven miles downstream and is shown in Photo 10.

About 1,000 feet downstream of the railroad bridge, Main Street, Milo, is carried over the Sebec River on two bridges with an island between them. These are shown in Photos 11 and 12. Just upstream westerly of the two bridges is a timber crib dam seen in the foreground of Photo 13.

### 3.2 EVALUATION

On the basis of the visual examination this dam is considered to be in fair condition.

Continued spalling and eroding of the concrete of the old power station could endanger the integrity of the structure, possibly resulting in the uncontrolled release of the waters of Sebec Lake.

## SECTION 4: OPERATIONAL AND MAINTENANCE PROCEDURES

### 4.1 OPERATIONAL PROCEDURES

a. General - The basic operating procedure is to follow an operations rating curve by holding or releasing water as needed for power generation at Howland Power Station about 25 miles downstream. An accessory procedure is to release water as needed to supply the intake for the Iilo Water District. In addition, an effort is made to hold the level of Sebec Lake fairly constant from July 1 to September 1 in deference to the Sebec Camp Owners Association.

During periods of heavy flow, the site is visited by operating personnel about every other day. During other periods, the visits are approximately biweekly.

b. Warning System - No warning system is known to exist.

### 4.2 MAINTENANCE PROCEDURES

a. General - The dam receives no regular maintenance, but rather on an "as necessary" basis.

b. Operating Facilities - Maintenance of operating facilities is minimal.

### 4.3 EVALUATION

The operation and maintenance procedures at this dam are inadequate to ensure that all problems encountered can be remedied within a reasonable period of time. The owner should establish a written operation and maintenance procedure as well as a warning system to follow in the event of an emergency at the dam.

## SECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

### 5.1 GENERAL

The project is a low surcharge - large storage timber crib structure, originally constructed and used for hydro power production, but currently used for stream regulation and water storage.

The tributary watershed consists of 327 square miles of undeveloped terrain which is virtually 100% wooded. With NGVD elevations ranging from 320 to over 2600 feet, portions of the watershed are very steep, but average watershed slope is approximately 3%. Further, the watershed contains numerous lakes and ponds, the aggregate surface area of which comprises about 10% of the watershed area. For purposes of hydrologic computation, the watershed is thus considered relatively flat.

Adjacent to and upstream of the dam, a roadway bridge crosses the approach channel with its bottom steel about 8.2 feet above the spillway crest. This bridge produces a hydraulic effect at higher flows.

Hydraulics computations indicate that downstream channel characteristics would control discharge from the dam at flows in excess of 15,000 cfs. Occurrence of the test flood would completely inundate the dam by virtue of the backwater from the downstream channel. The full spillway would accommodate about 22% of the routed Test Flood outflow from the dam, but would accommodate about 63% of the maximum flow which could be controlled by the dam.

### 5.2 DESIGN DATA

No design data are known to exist for this project.

### 5.3 EXPERIENCE DATA

The maximum known flood at the dam site occurred March 20, 1936, producing a peak outflow of 11,400 cfs. The dam reportedly failed on that date, releasing a major fraction of the storage in Sebec Lake, and contributing significantly to the severe downstream damages incurred during the general flooding at the time. No detailed information concerning the exact nature or extent of the failure was located.

### 5.4 TEST FLOOD ANALYSIS

The Test Flood for this significant hazard large size dam is the Probable Maximum Flood (PMF). Peak inflow to Sebec Lake is 85,000 cfs (260 csm) and was determined using the "Flat and Coastal" guide curve of the "Preliminary Guidance for Estimating Maximum Probable Discharge", dated March, 1978. Peak outflow is 43,000 cfs with the water elevation 26.5 feet above the spillway crest and the initial reservoir level assumed at the permanent flashboard crest (el. 323 NGVD). Based upon hydraulics computations, the spillway capacity is 9,400 cfs which is approximately 22% of the routed Test Flood outflow from Sebec Dam. Test Flood outflow is controlled by the reach circuitly

downstream of the dam, the backwater from which would, at flows in excess of about 15,000 cfs, submerge the dam. The spillway capacity is thus about 68% of that flow on which the dam would act as a control.

### 5.5 DAM FAILURE ANALYSIS

Utilizing the April, 1978 "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow with the pool initially at the top of the dam (el. 330.4 NGVD) would be approximately 13,000 cfs, an increase of 3,600 cfs above the estimated 9,400 cfs pre-failure flow. The breach would cause an increase in stage immediately downstream from the dam from about 18 feet to 22 feet, which would likely cause little further damage as two seasonal residences in the area would be destroyed by the pre-failure flow. Further downstream, approximately 3.8 miles from the dam, the sudden increase in stage from 5.2 feet to 6.8 feet would be sufficient to flood two or three seasonal residences to a depth of about 1 foot. Further downstream, estimated stage increases of 1 foot or less would create little damage beyond that caused by the pre-failure flow.

The consequences of a "dry weather" failure with the water level initially at the top of the flashboards (323 NGVD) was also investigated. A pre-failure flow of about 300 cfs emanating from one sluice gate was assumed. The peak failure outflow would be 6,600 cfs. The sudden increase in stage from 5 feet to 15 feet immediately downstream from the dam would flood two seasonal residences in the area to a depth of about 4 feet. Further downstream, resulting increases in stage would be expected to cause little damage.

There is potential for considerable property damage and possible loss of a few lives, thus Sebec Dam has been classified as a "Significant Hazard" dam.

## SECTION 6: EVALUATION OF STRUCTURAL STABILITY

### 6.1 VISUAL OBSERVATION

The visual inspection of the dam indicates the following potential problem:

Continued spalling and eroding of the concrete of the old power station could endanger the integrity of the structure possibly resulting in the uncontrolled release of the storage contained in Sebec Lake.

### 6.2 DESIGN AND CONSTRUCTION DATA

No original design and construction data are available for the dam.

### 6.3 POST-CONSTRUCTION CHANGES

The rock-filled timber crib dam is shown on the plan of Sebec Village in the 1882 Colby Atlas. There was at that time a saw mill at the site. In about 1920, an attempt was made by the Boston Excelsior Co. of Milo, Maine, to construct a stone masonry and concrete dam, together with a power station, adjacent to and downstream of, the original timber-crib structure. The new dam reportedly failed as it was being filled and the timber crib dam was subsequently renovated and utilized in conjunction with the power station. The dam sustained damage in the 1936 flood and was subsequently repaired. On August 19, 1940, the powerhouse burned. The dam was at that time owned by Maine Public Service Company. The structure has since been acquired by the Bangor Hydro-Electric Company and has, since 1960, undergone considerable renovation work, including sheet piling, concrete cap and aprons, and new sluice gates.

### 6.4 SEISMIC STABILITY

The dam is located in Seismic Zone 2, and in accordance with the recommended Phase 1 guidelines does not warrant seismic investigation.

## SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

### 7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection, the dam is judged to be in fair condition.

b. Adequacy of Information - Due to the lack of design and construction data for this dam, the assessment of safety is based solely on the visual inspection.

c. Urgency - The remedial measures and recommendations presented below should be implemented by the owner within one year after receipt of this Phase I Inspection Report.

### 7.2 RECOMMENDATIONS

The owner should engage a qualified registered engineer to further assess the spalled and eroded concrete of the old power station and fishway and submit recommendations for the repair and rehabilitation of the same.

The owner should implement all recommendations by the engineer.

### 7.3 REMEDIAL MEASURES

a. A program of annual technical inspection, with repairs as necessary, should be instituted by the owner.

b. The dam should be monitored during flood periods and a formal downstream warning system, to be implemented in the event of an emergency at the dam, should be developed by the owner.

c. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

### 7.4 ALTERNATIVES

This study has identified no practical alternative to the above recommendations.

APPENDIX A  
VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECKLIST  
PARTY ORGANIZATION

PROJECT Guar Dam

DATE Nov. 4, 1950

TIME 9:00

WEATHER Cloudy

W.S. ELEV.    U.S.    D.N.S.   

PARTY:

1. Station 1000 ft. of Dam 6.
2. Project Office 7.
3. Control Station 8.
4. Project Laboratory 9.
5. 10.

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Project Office</u>	<u>S.D.P. - S.D.P. - S.D.P.</u>	
2. <u>Project Laboratory</u>	<u>S.D.P. - S.D.P. - S.D.P.</u>	
3. <u>Control Station</u>		
4. <u>Project Laboratory</u>		
5.		
6.		
7.		
8.		
9.		
10.		

PROJECT Chico Lake DATE 10/10/79  
 PROJECT FEATURE Concrete Gravity Dam NAME John C. Miller  
 DISCIPLINE Geotechnical NAME John C. Miller

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	Concrete embankment with an upstream hydraulic tailwater. Main section of dam and hydro plant founded on glacial till with abutments on bedrock and on glacial till.
<u>Crest Elevation</u>	
<u>Current Pool Elevation</u>	
<u>Maximum Impoundment to Date</u>	
<u>Surface Cracks</u>	
<u>Pavement Condition</u>	
<u>Movement or Settlement of Crest</u>	
<u>Lateral Movement</u>	None observed.
<u>Vertical Alignment</u>	Good
<u>Horizontal Alignment</u>	Good
<u>Condition at Abutment and at Concrete Structures</u>	Condition at abutment contact is good.
<u>Indications of Movement of Structural Items on Slopes</u>	
<u>Trespassing on Slopes</u>	N. A.
<u>Sloughing or Erosion of Slopes or Abutments</u>	N. A.
<u>Rock Slope Protection - Riprap Failures</u>	N. A.
<u>Unusual Movement or Cracking at or Near Toe</u>	N. A.
<u>Unusual Embankment or Downstream Seepage</u>	N. A.
<u>Piping or Boils</u>	N. A.
<u>Foundation Drainage Features</u>	N. A.
<u>Toe Drains</u>	N. A.
<u>Instrumentation System</u>	N. A.
<u>Vegetation</u>	N. A.

## PERIODIC INSPECTION CHECKLIST

PROJECT Day DATE 10/10/80PROJECT FEATURE NAME John C. DayDISCIPLINE Geotechnical NAME John C. Day

AREA EVALUATED	CONDITION
<b>DIKE EMBANKMENT</b>	None indicated.
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or Near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

PROJECT 5 DATE 10/10/68PROJECT FEATURE INTAKE CHANNEL AND INTAKE STRUCTURE NAME DISCIPLINE Structural NAME 

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	
Slope Conditions	Subject to the right orientation and operation of the log boom.
Bottom Conditions	There is a concrete foundation which is in the good condition.
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	Concrete is in a good shape amount of spalling with some erosion and efflorescence
Stop Logs and Slots	

## PERIODIC INSPECTION CHECKLIST

PROJECT \_\_\_\_\_

DATE \_\_\_\_\_

PROJECT FEATURE \_\_\_\_\_

NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

## AREA EVALUATED

## CONDITION

## OUTLET WORKS - CONTROL TOWER

The outlet works control tower

## a. Concrete and Structural

N/A

General Condition

Condition of Joints

Spalling

Visible Reinforcing

Rusting or Staining of Concrete

Any Seepage or Efflorescence

Joint Alignment

Unusual Seepage or Leaks in Gate Chamber

Cracks

Rusting or Corrosion of Steel

## b. Mechanical and Electrical

N/A

Air Vents

Float Wells

Crane Hoist

Elevator

Hydraulic System

Service Gates

Emergency Gates

Lightning Protection System

Emergency Power System

Wiring and Lighting System

## PERIODIC INSPECTION CHECKLIST

PROJECT \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

CIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
LET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	
rust or Staining on Concrete	
palling	
erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PROJECT NUMBER \_\_\_\_\_

DATE \_\_\_\_\_

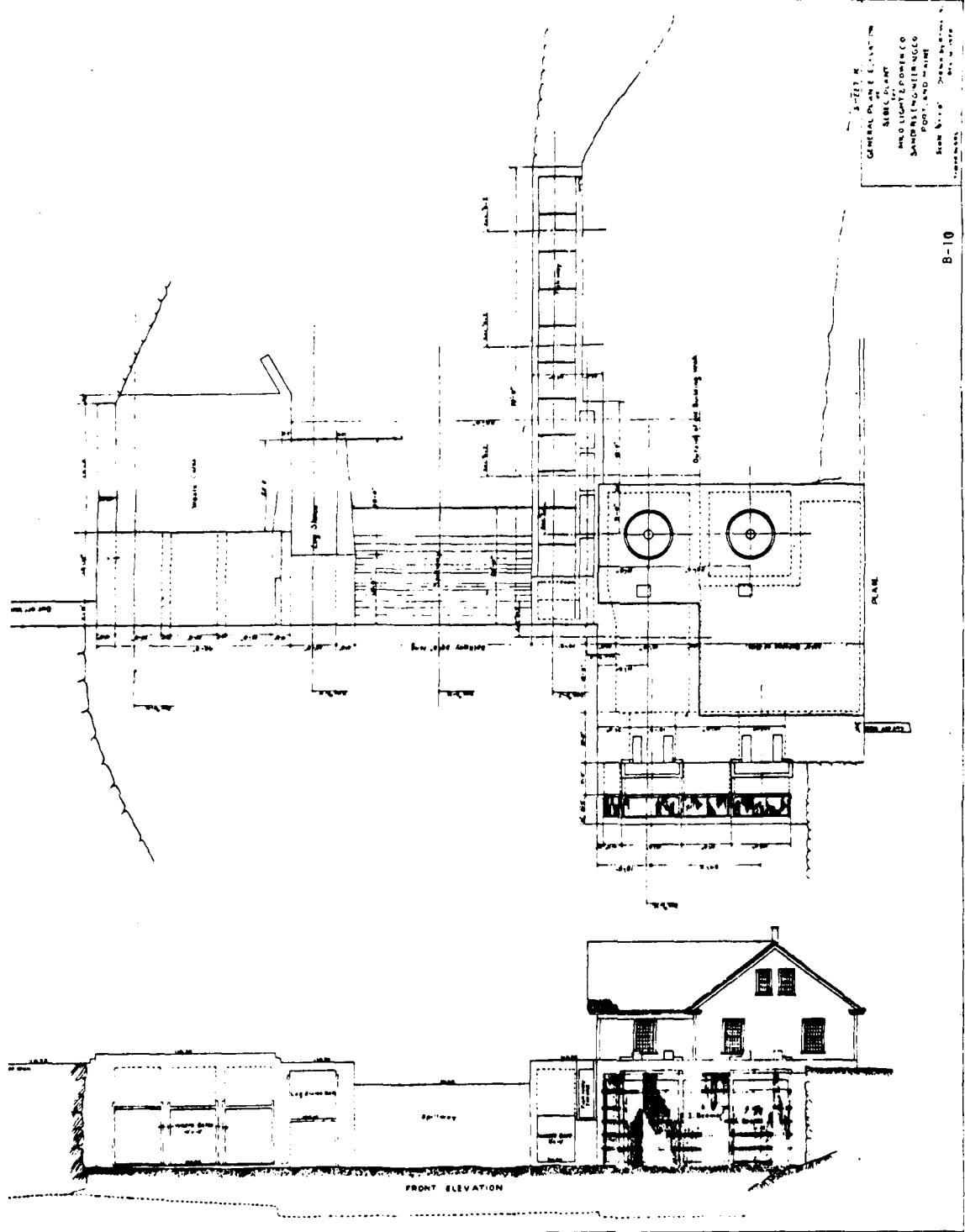
OBJECT FEATURE \_\_\_\_\_

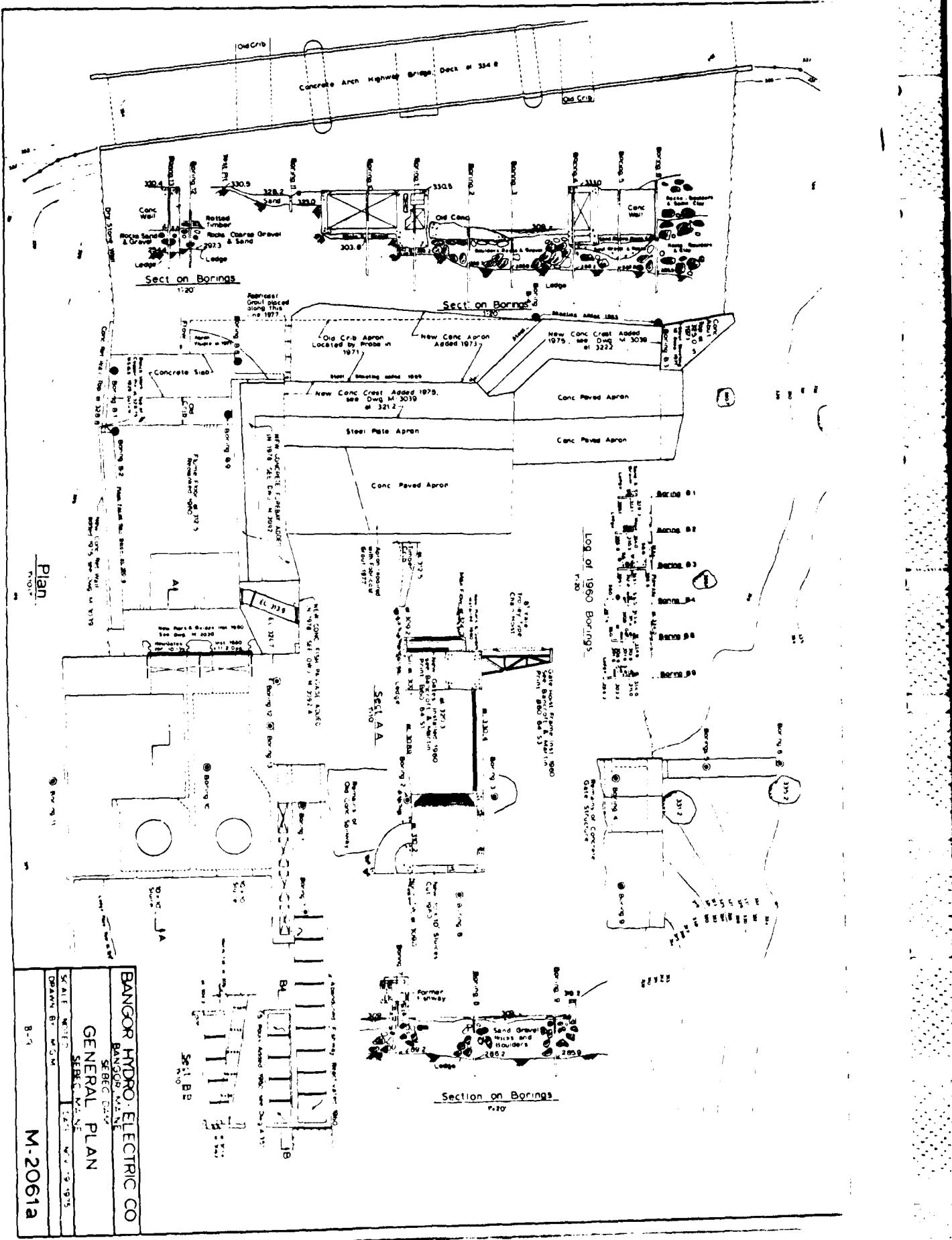
NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
LET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
rust or Staining	Very slight staining
Spalling	Very slight spalling
Erosion or Cavitation	Very slight erosion
Visible Reinforcing	Visible reinforcing
Any Seepage or Efflorescence	Very slight seepage at outlet channel
Condition at Joints	Good
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	Very slight loose rock
Condition of Discharge Channel	Good





**BANGOR HYDRO-ELECTRIC CO.**  
 BANGOR, MAINE  
 SEBEC DIVISION

**GENERAL PLAN**

Scales: 1/2 mile, 1/4 mile, 1/2000

Drawn by: W. J. M.

B-1

**M-2061a**

Salmon	Fishes
Brook trout (squaretail)	Chain pickerel
Large mouth bass	Smelt
Small mouth bass	Eel
Whitefish	White sucker
Yellow perch	Minnows
Walleye	Cusk

### Physical Characteristics

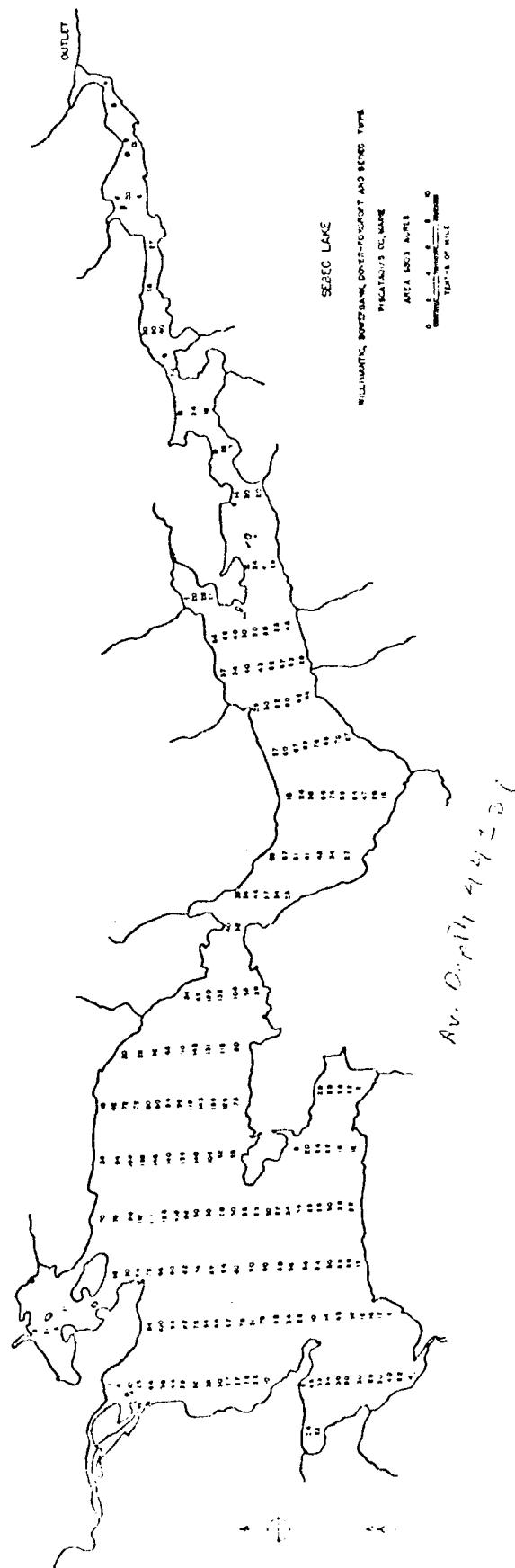
Area	Characteristics	Temperatures
Maine	Length - 155 feet	Surface - 75° F.
Maine	Depth - 150 feet	150 feet - 45° F.

Sebec Lake is very shallow, lake trout, smallmouth bass, and whitefish are the only fish species found in the lake. The water volume is cold with abundant dissolved oxygen at all depths in late summer.

In 1966 Sebec Lake was managed for its fine natural salmonid population. However, in the years 1961 through 1966 lake trout were stocked in order to utilize the large amount of excess water and increase the fishing potential of the lake. These lake trout have gone to create a well established population and are reproducing naturally in the lake. They are providing an excellent sport fishery in addition to the salmon for both summer and winter sport fishers.

Regulations controlling the size and bag limit of bass have been established in hopes of reducing competition from this species. The recently set by the minimum length limit for salmon is 12 inches. This allows anglers to take advantage of large numbers of chinook salmon that are slow to reach the normal 14-inch minimum length.

Survey 17-1650  
(August 14, 1970)  
Maine Department of Inland Fisheries and Game  
Published under Appropriation No. 4223.



J. B. S. HEDGES

Project: 5115 LIVERPOOL, MI

Location, Lat 45° 11' 12", Long 75° 55' 44", Presque Isle County, Mich. Lake Huron Cl. 1900-04, on right bank 1,600 ft. upstream from highway bridge and dam at outlet of Presque Isle at Sault.

MINERAL AREA, 327 mi<sup>2</sup> (847 km<sup>2</sup>).

PERIOD OF RECORD - October 1924 to current year.

CAGE,--Water-stage recorder. Rating of gauge is 260.3 ft (79.81 m) above mean sea level. Prior to June 22, 1942, at site on opposite bank of it (ft m) downstream at same datum.

REMARKS. - Records good except those for period of 10-day height record, which are fair. Flow regulated by Sebec Lake (Reservoir in tributary River Sebec) and other reservoirs upstream. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE: 53 years, 631 ft<sup>3</sup>/s (17,87 m<sup>3</sup>/s), 21.20 in/yr (665 mm/yr), unadjusted.

EXTREMES FOR PERIOD OF RECORD - May 1947 to April 1948. (See Fig. 2, May 26, 1948, page height, 14.56 ft (4.407 m) from top of concrete pier to water surface, and Fig. 3, May 26, 1948, velocity-area studies; current, about 2 ft/sec (0.607 m/sec) over 14.47 ft, page height, east of pier (0.705 ft), when gates in dam were closed.

EXTREMES FOR THE ENTIRE YEAR. Maximum discharge, 2,640 ft<sup>3</sup>/s (74.8 m<sup>3</sup>/s) Apr. 24, page height, 6.64 ft (1.841 m); minimum daily, 27 ft<sup>3</sup>/s (0.116 m<sup>3</sup>/s) Oct. 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
1	600	631	350	321	585	267	1690	1910	136	1550	245	285	
2	590	656	374	316	450	271	1430	1610	142	1430	240	290	
3	580	636	374	316	405	267	2640	1740	145	1040	245	290	
4	570	669	394	307	400	197	2690	1630	148	437	245	280	
5	560	1020	340	307	395	216	2080	1530	151	503	245	280	
6	540	1250	310	303	390	269	2060	1430	154	434	245	280	
7	491	1240	345	299	385	201	1960	1380	161	401	240	276	
8	440	1200	357	299	375	193	1670	1280	168	390	236	267	
9	457	1130	547	307	370	186	1600	1080	164	216	236	262	
10	669	1020	466	307	365	186	1780	984	161	209	232	262	
11	696	947	572	307	360	189	1780	969	164	205	236	262	
12	676	890	566	307	355	205	1700	947	168	205	236	262	
13	644	835	550	305	350	228	1430	619	158	205	236	262	
14	638	782	634	305	345	340	1510	105	148	209	236	262	
15	595	743	503	305	335	601	1600	105	148	209	236	480	
16	560	702	485	300	335	911	1670	105	145	205	262	1110	
17	497	676	474	300	325	1450	1750	110	139	213	290	1670	
18	468	553	462	300	325	1550	1860	112	145	249	294	1040	
19	193	457	434	300	320	1560	1590	120	154	249	290	1010	
20	77	534	412	294	315	1500	2120	125	171	245	290	962	
21	112	485	401	290	310	1380	2250	125	193	245	290	897	
22	117	457	390	290	305	1260	2410	125	197	245	290	835	
23	154	457	374	303	300	1170	2560	125	253	245	290	743	
24	232	429	374	294	295	1100	2610	128	285	245	290	644	
25	321	406	369	290	290	1060	2610	130	316	245	290	563	
26	434	395	359	290	285	1070	2540	130	457	245	290	522	
27	516	395	354	290	285	1070	2420	130	702	245	290	572	
28	547	390	354	290	280	1100	2310	130	801	245	290	655	
29	553	401	340	290	---	1110	2190	136	815	240	280	918	
30	553	395	335	285	---	1170	2040	136	1260	240	280	977	
31	566	---	330	425	---	1380	---	136	---	245	265	---	
TOTAL	14646	20817	13049	9442	9635	23617	60620	19522	8349	11649	8180	17038	
MEAN	472	694	421	305	351	762	2021	630	278	376	264	568	
MAX	696	1250	572	465	585	1560	2610	1910	1260	1550	294	1110	
MIN	77	350	310	265	280	186	1430	105	136	205	232	262	
MEAN1	666	641	580	224	115	1005	2181	557	601	150	209	574	
CFSM1	2.10	1.96	1.16	.68	.35	3.07	6.67	1.64	1.54	.58	.64	1.57	
IN.4	2.42	2.18	1.34	.79	.37	3.54	7.44	1.89	2.05	.67	.74	1.98	
CAL YR 1976 TOTAL	317148	MEAN	667	MAX	5210	MIN	77	MEAN1	866	CFSM1	2.65	IN.4	56.08

WTR YR 1977 TOTAL 216764 MEAN 594 MAX 2610 MIN 77 MEAN 612 CESM1 1.87 ISL4 25.42

Adjusted for change in contents in Sebec Lake.  
NOTE. - No gage-height record Jan. 30 to Mar. 3.

## 26 Generators

No. of Units	Make	Date Installed	K. W. Per Unit	Voltage	Amp.	Capacity K.V.A.

27 Steam Plant Capacity

K.W.

H.P.

28 Fuel

29 Remarks

(PASTE PHOTO HERE)

30 Information furnished by R. E. Stratton  
Bangor Hydro-Electric Company

Title Hyd. Engr.,

31 Information obtained by R. A. Ranger  
PUC Engineer

Date 9-28-1964

# MEO00791

10-28-50

P. U. C. & U. S. G. S.  
WATER POWER CENSUS

## APPLICATION FOR DAM REGISTRATION

Location:County: PiscataquisMunicipality: SebecName of Dam: Sebec Lake DamName of Impoundment: Sebec LakeOwnership:Name of Owner: Bangor Hydro-Electric Company

Name of Agent: \_\_\_\_\_

(If different from owner)

Address of Owner: 33 State St.

Address: \_\_\_\_\_

Bangor, Maine 04401Telephone Number: 945-5621

Telephone Number: \_\_\_\_\_

Description of DamType: Storage

Type: \_\_\_\_\_

Construction Material: Timber Crib with Concrete Deck  
(Concrete, wood, earth)

Construction Material: \_\_\_\_\_

Year Originally built: UnknownYear last major repair: 1975Height: 12 Ft.Width: 250 Ft.Spillway type: Overfalling & GatesSpillway Width: Crest Length 170 Ft.Impounding Capacity: 36800  
(Acre-feet)Drawdown available: 6  
(feet)Is Pumping available?: YesInstalled Electrical Generating Cap: 0Type of outlet for which stored water is used: Ammons Flows of Piscataquis/Penobscot Rivers  
for power generation.Recent Inspection by Qualified Engineer (Date): fall 1971Name & Address of Applicant: Richard E. Gervette, General ManagerName of Project: Sebec Lake Dam

Signature: \_\_\_\_\_

SUMMARY OF DATA AND CORRESPONDENCE

DATE

SUBJECT

3-16-77	Dam registration sheet from Soil and Water Conservation Commission
	Dam Inventory sheet from P.U.C. and USGS
1882	Plan of Sebec Village from Colby Atlas
1977	Stream Flow Records at Sebec From USGS Water Resources Data for Maine Water, Year 1977
1970	Sebec Lake Survey and Chart by Department of Inland Fisheries and Game

SEBEC DAM  
EXISTING PLANS

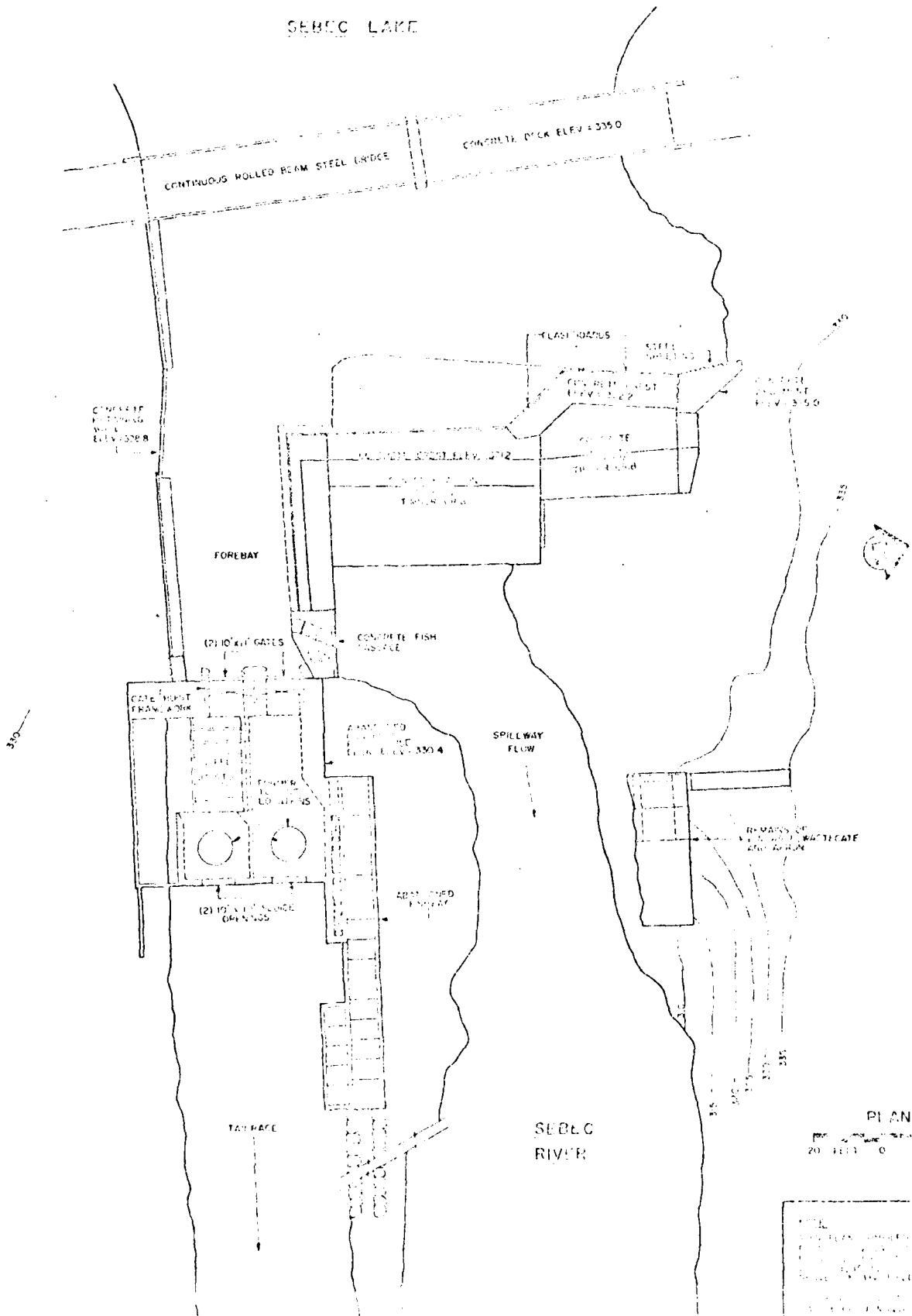
On file with Bangor Hydro-Electric Company:

1. Sebec Lake Dam, Proposed Concrete Forebay, Changes to Accommodate Fishway M-3092A, September 1, 1978
2. Sebec Lake Dam, Proposed Concrete Forebay, M-3092, August 29, 1977
3. Sebec Dam, General Plan, Sebec, Maine, M-2061A, Nov. 19, 1975
4. Sebec Dam, General Plan, Sebec, Maine, M-2061, January 23, 1961

On file with the Maine Office of Energy Resources:

1. Survey, Excavation and General Plan, Sebec Power Station and Dam for Boston Excelsior Co., Milo, Maine, August 20, 1920
2. Excavation for Dam and Tail Race, Sebec Power Station and Dam for Boston Excelsior Co., Milo, Maine, August 21, 1920
3. Plan and Section of Large Gates and Frames for Boston Excelsior Co., Milo, Maine, Dam at Sebec, Maine, September 1920
4. Plan of Station and Headgates, Sebec Plant for Milo Light and Power Co., December 30, 1920
5. Sections of Flume, Dam, etc., Sebec Plant for Milo Light and Power Co., December 15, 1920
6. Transverse Sections of Flume and Fishway, Sebec Plant for Milo Light and Power Co., January 12, 1921
7. Plan and Section of Fishway, Sebec Plant for Milo Light and Power Co., December 22, 1920
8. General Plan and Elevation, Sebec Plant for Milo Light and Power Co., December 13, 1920
9. Water Racks and Fishway Gates, Sebec Plant for Milo Light and Power Co., January 20, 1921
10. Waste Way and Log Sluice, Sebec Plant for Milo Light and Power Co., October 20, 1920

## SEBEC LAKE



### PLAN VIEW

29 1111 0 65 4

US AIR FORCE BIRD DIV. 5000 FT. ELMWOOD  
1000 FT. DEEP  
1000 FT. DEEP  
1000 FT. DEEP

APPENDIX B  
ENGINEERING DATA

## PERIODIC INSPECTION CHECK LIST

PROJECT S. 1000' C. 1000' 1000' 1000' DATE 10/10/68  
 PROJECT FEATURE   NAME    
 DISCIPLINE Structural Engineer NAME  

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	<u> </u>
a. Super Structure	<u> </u>
Bearings	<u> </u>
Anchor Bolts	<u> </u>
Bridge Seat	<u> </u>
Longitudinal Members	<u> </u>
Underside of Deck	<u> </u>
Secondary Bracing	<u> </u>
Deck	<u> </u>
Drainage System	<u> </u>
Railings	<u> </u>
Expansion Joints	<u> </u>
Paint	<u> </u>
b. Abutment & Piers	<u> </u>
General Condition of Concrete	<u> </u>
Alignment of Abutment	<u> </u>
Approach to Bridge	<u> </u>
Condition of Seat & Backwall	<u> </u>

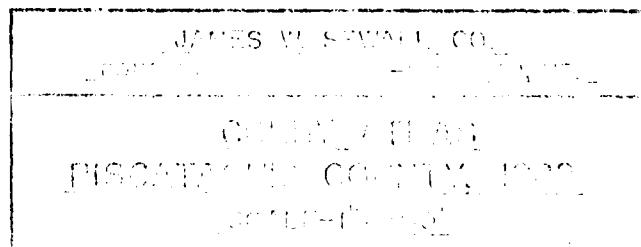
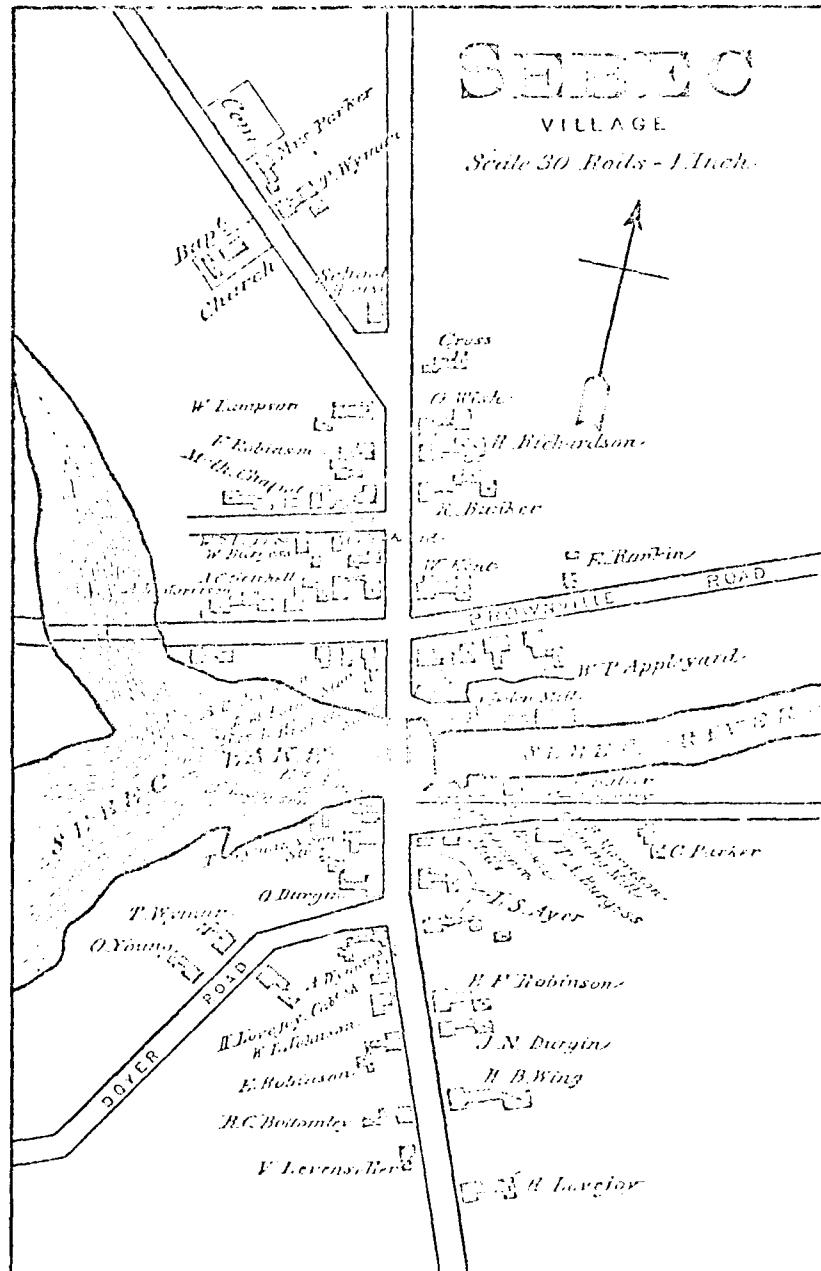
## PERIODIC INSPECTION CHECKLIST

PROJECT \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

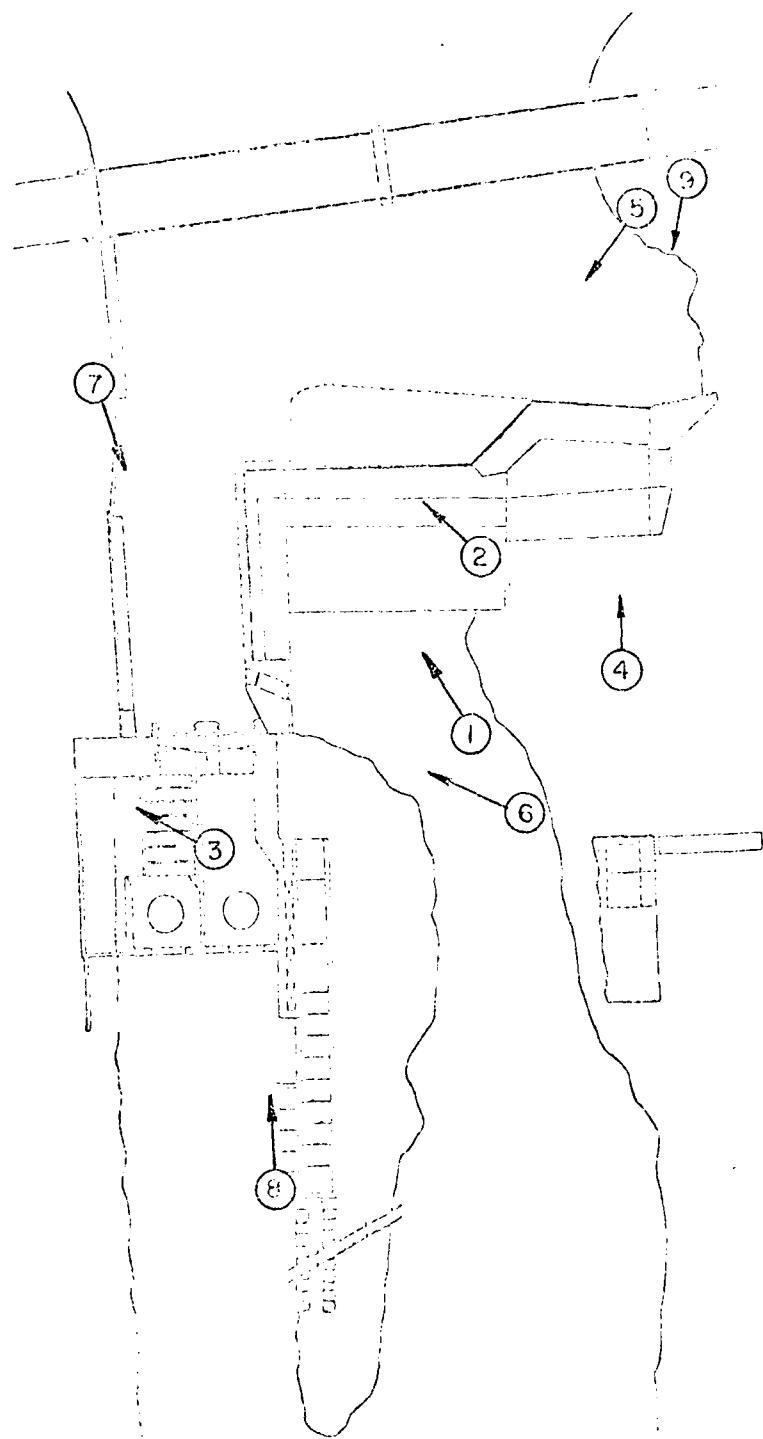
DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Some debris on floor and walls
b. Weir and Training Walls	
General Condition of Concrete	Good, with some staining and slight cracking on training walls
Rust or Staining	None
Spalling	None
Any Visible Reinforcing	None
Any Seepage or Efflorescence	None
Drain Holes	None
c. Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None of importance
Floor of Channel	Not visible
Other Obstructions	None



APPENDIX C  
DETAIL PHOTOGRAPHS

OVERVIEW



⑩ ⑪ ⑫ ⑬

TAKEN  
DOWNSTREAM

SELECTED DAM  
PHOTOD LOCATION PLAN

APPENDIX D  
HYDRAULIC/HYDROLOGIC COMPUTATIONS



1. Rock-filled Timber Cribwork Visible Under Concrete

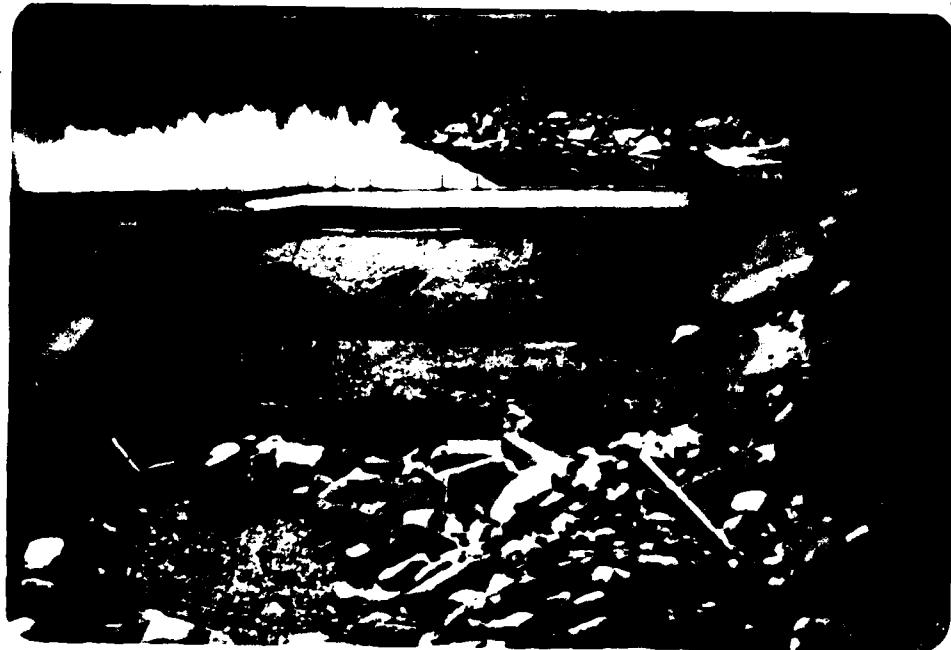


2. Downstream Side of Concrete Capped Spillway Crest.  
Concrete Apron at Left Foreground.

U.S.ARMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Sebec Dam
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		ME 00163 Sebec, Maine Nov. 4, 1980
		C-2



3. Exposed Bedrock at Right Abutment.  
Steel Joists Supported Former  
Powerhouse.



4. Area at Left Abutment

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WALTHAM, MASSACHUSETTS

JAMES W. SEWALL COMPANY  
CONSULTANTS  
OLD TOWN, MAINE

NATIONAL PROGRAM OF  
INSPECTION OF  
NON-FED. DAMS

Sebec Dam

ME 00163

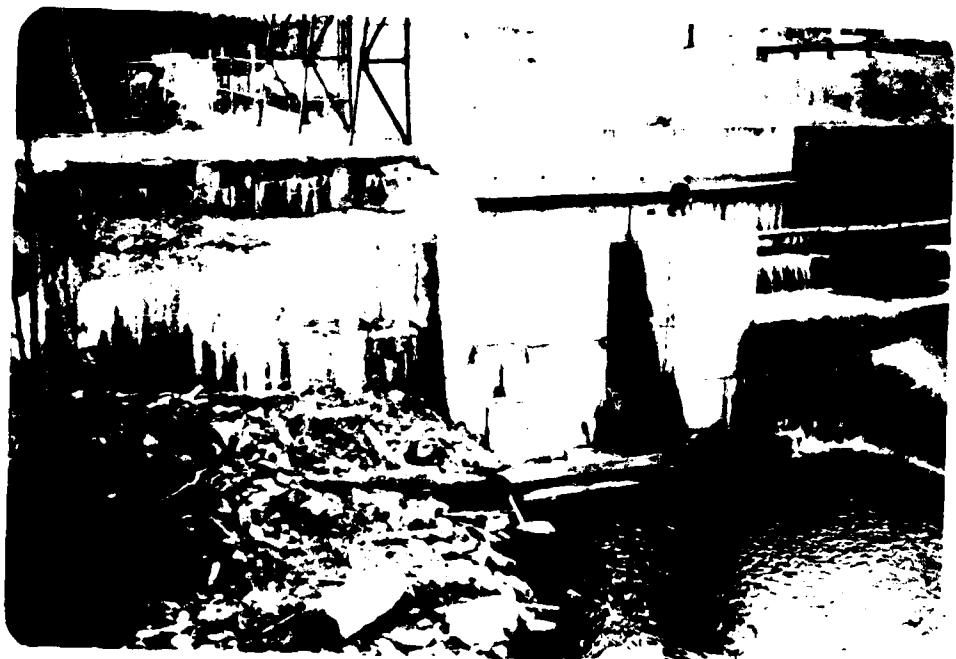
Sebec, Maine

Nov. 4, 1980

C-3



5. View of Forebay at Right, Gate Structure and Substructure of Former Power Station at Center Behind Uncompleted Fish Passage.



6: Uncompleted Fish Passage Adjacent to Power Station Substructure.

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NATIONAL PROGRAM OF  
INSPECTION OF  
NON-FED. DAMS

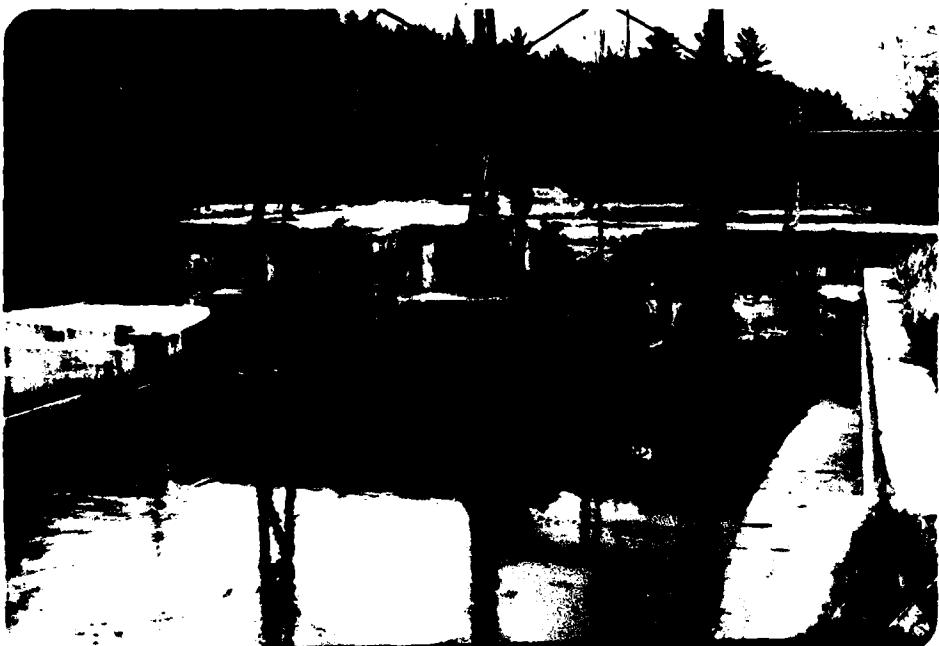
Sebec Dam

ME 00163

Sebec, Maine

Nov. 4, 1980

C-4



7. Sluice Gates at End of Forèbay



8. Outlet Openings in Downstream Foundation Wall of Power Station at Left, Abandoned Fishway at Right.

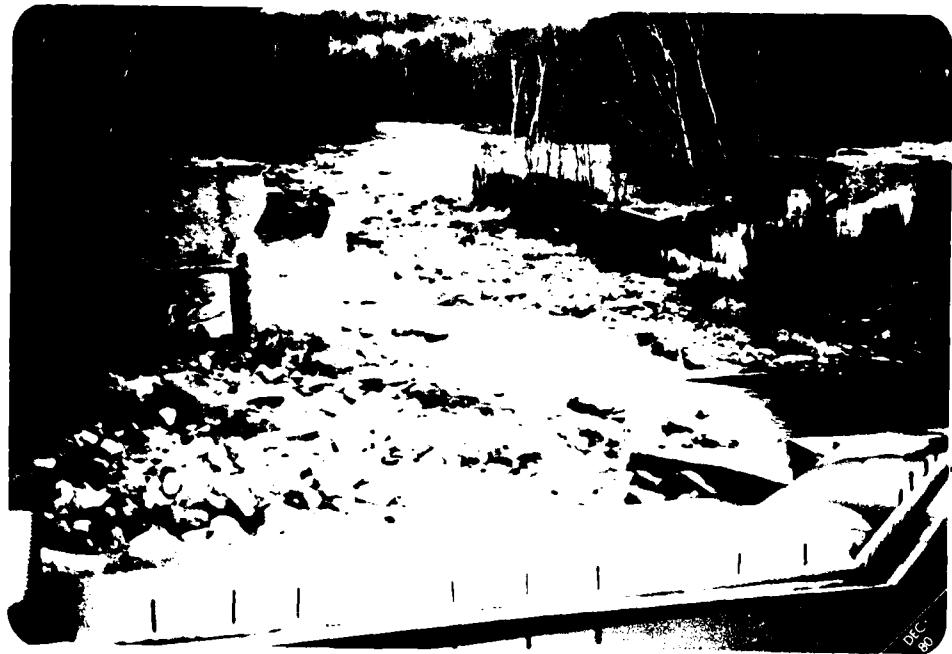
U.S.ARMY ENGINEER DIV, NEW ENGLAND  
CORPS OF ENGINEERS  
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NON-FED. DAMS

Sebec Dam  
ME 00163  
Sebec, Maine  
Nov. 4, 1980

C-5



D.C.  
80

9. Original Riverbed Below Spillway Section of Dam. Abandoned Fishway and Masonry Training Wall at Right, Remains of Wastegate Section of Former Dam at Left Bank.



10. Railroad Bridge Crossing Sebec River In Milo.

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NATIONAL PROGRAM OF  
INSPECTION OF  
NON-FED. DAMS

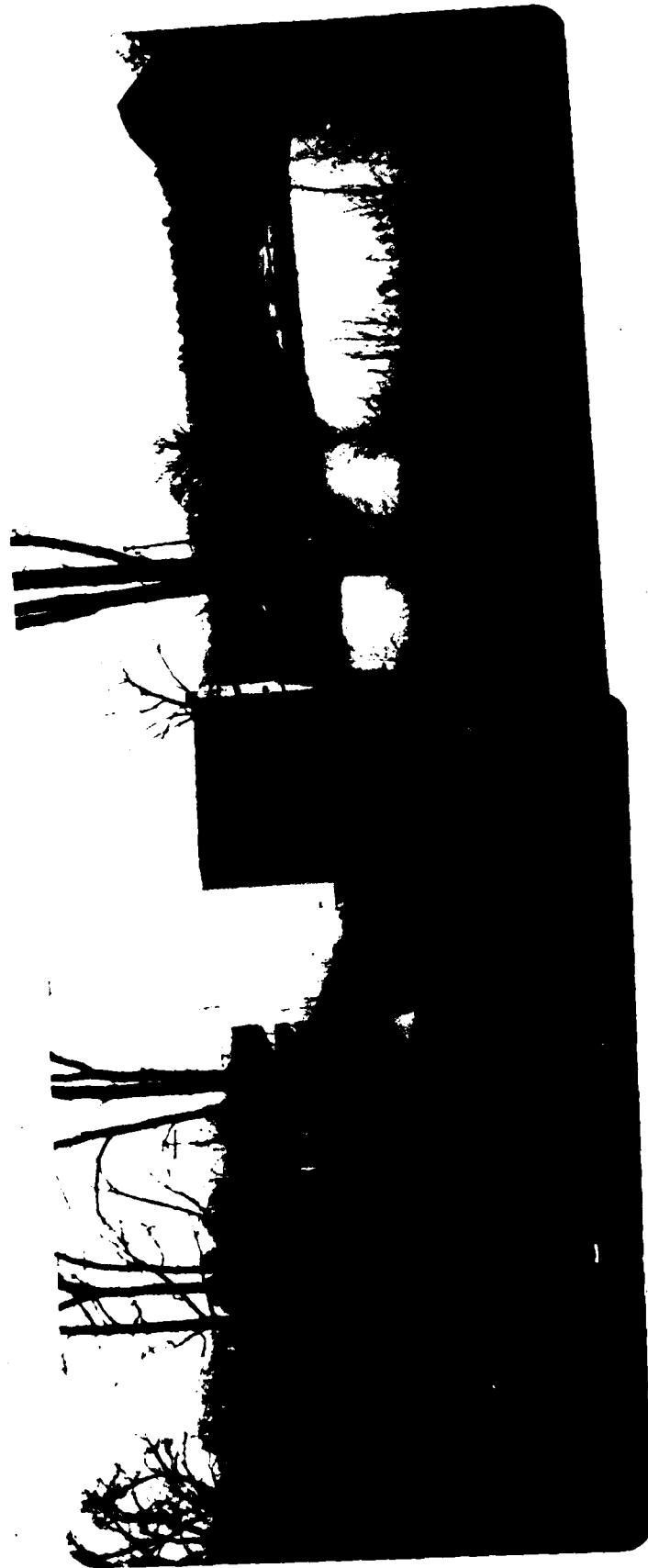
Sebec Dam

ME 00163

Sebec, Maine

Nov. 4, 1980

C-6



11. & 12. Two Bridges Carry Main Street, Milo, Over the Sebec River

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NON-FED. DAMS

Sebec Dam  
ME 00163  
Sebec, Maine  
Nov. 4, 1980

C-7



13. Timber Crib Dam Above the Westerly Main Street Bridge in Milo.

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INSPECTION OF  
NON-FED. DAMS

Sebec Dam

ME 00163

Sebec, Maine

Nov. 4, 1980

C-8

DRAINAGE AREA  
327 SQ MILES

PRIMARY  
IMPACT  
AREA

SEBEC DAM

1:250,000 QUADRANGLE  
KETCHUM, ID. 1954  
SCALE 1:250,000

JAMES M. SEWALL COMPANY, C. L. TOWN, CHIEF  
Civil and Sanitary Engineers

Sheet 1 of 1

dated 10/22/1942 at 10:00 A.M.

station 100 ft. Job No. 100-1008

ited by John M. Seewall Checked by John M. Seewall Date 10/22/1942

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

JAMES M. SEXTON COMPANY, LTD. 1926, LTD.  
Civil and Sanitary Engineers

Sheet 1 of 1

Station 100.00 ft Job No. 100.00 ft

Ed by 1 Checked by 2 Date 11-11-11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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James M. Small Collection  
Civil and Military Hospital

Exhibit 10

On 10/1/68 Checked by DR. J. M. SMALL

1 by DR. J. M. SMALL Checked by DR. J. M. SMALL

James M. Small Company, G.E.B. Inc., Inc.  
Civil and Sanitary Engineers

Sheet 1 of 11

ation \_\_\_\_\_ Job No. \_\_\_\_\_

ed by \_\_\_\_\_ checked by \_\_\_\_\_ Date \_\_\_\_\_

1.  2.  3.  4.  5.  6.  7.  8.  9.  10.  11.  12.  13.  14.  15.  16.  17.  18.  19.  20.  21.  22.  23.  24.  25.  26.  27.  28.  29.  30.  31.  32.  33.  34.  35.  36.  37.  38.  39.  40.  41.  42.  43.  44.  45.  46.  47.  48.  49.  50.  51.  52.  53.  54.  55.  56.  57.  58.  59.  60.  61.  62.  63.  64.  65.  66.  67.  68.  69.  70.  71.  72.  73.  74.  75.  76.  77.  78.  79.  80.  81.  82.  83.  84.  85.  86.  87.  88.  89.  90.  91.  92.  93.  94.  95.  96.  97.  98.  99.  100.  101.  102.  103.  104.  105.  106.  107.  108.  109.  110.  111.  112.  113.  114.  115.  116.  117.  118.  119.  120.  121.  122.  123.  124.  125.  126.  127.  128.  129.  130.  131.  132.  133.  134.  135.  136.  137.  138.  139.  140.  141.  142.  143.  144.  145.  146.  147.  148.  149.  150.  151.  152.  153.  154.  155.  156.  157.  158.  159.  160.  161.  162.  163.  164.  165.  166.  167.  168.  169.  170.  171.  172.  173.  174.  175.  176.  177.  178.  179.  180.  181.  182.  183.  184.  185. 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JAMES W. SEWALL COMPANY, OLD TOWN, MAINE  
Civil and Sanitary Engineers

Sheet 23 of 23

ct 1 Job No. 11-11-1  
station 6 Checked by W. H. S.  
ited by W. H. S. Date 11-11-1

| A |  | B |  | C |  | D |  | E |  | F |  | G |  | H |  | I |  | J  |  | K  |  | L  |  | M  |  | N  |  | O  |  | P  |  | Q  |  | R  |  | S  |  | T  |  | U  |  | V  |  | W  |  | X  |  | Y  |  | Z  |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |    |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |     |  |
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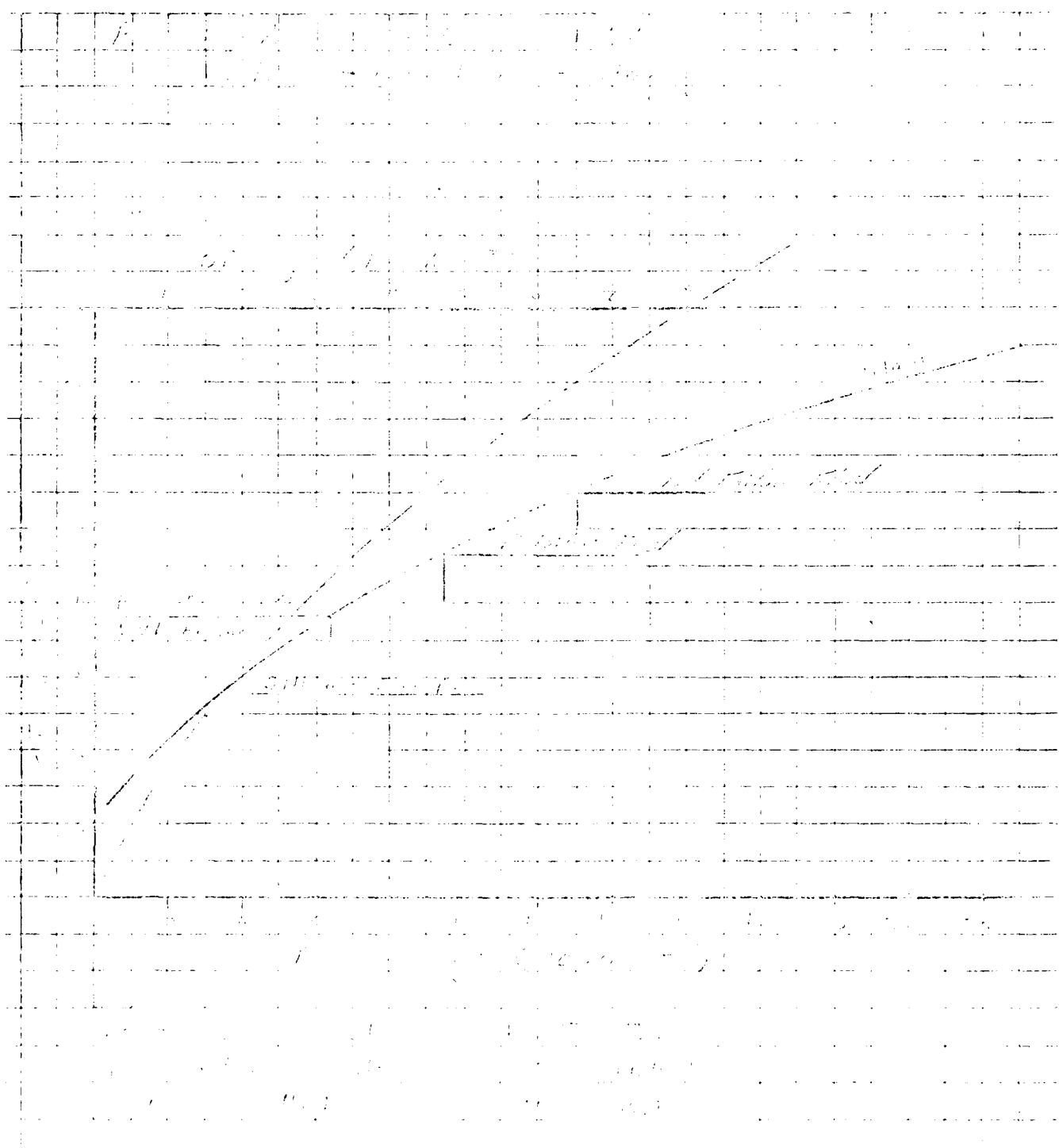
JAMES W. SEWELL COMPANY, OGDEN, UTAH  
Civil and Sanitary Engineer

Sheet 2 of 2

ject City of Ogden, Utah

uation 1950

uted by J. W. S. Checked by J. W. S. Date 10-10-50



JAMES M. SEWALL COMPANY, OLD TOWN, MAINE  
Civil and Sanitary Engineers

Sheet 1 of 1

Object Temp file - All Files (\*.\*)  
Location Local Disk (C:) Job No. 123456789  
Computed by John Doe Checked by John Doe Date 11-11-11

JAMES W. SEWALL COMPANY, OLD TOWN, FAIR  
Civil and Sanitary Engineers

Sheet 1 of 1

Subject: Information about the Internet

Computation \_\_\_\_\_ Job No. \_\_\_\_\_

Computed by W. J. H. Checked by W. J. H. Date 11/1/2023

a) Clark's sparrow (180) is the most  
common bird in the area.

b) Pileated woodpecker = 20000 sets

c) Least sandpiper = 20000 sets  
about 22000 sets of the total 100000 sets

d) At the first stage, the number of birds was  
split into 50 sets. The 33.3% (about 16660 sets)

e) The expected number of birds was  
about 100000 sets of a life = 50000 sets  
at full splitting stage.

JAMES W. SWALL COMPANY, OLD TOWN, MAINE  
Civil and Sanitary Engineers

Sheet 7 of 24

Subject: Population of North America

Computation Solve D, Job No. 958-01 R

Computed by SG h/ Checked by SP Date 11-20-10



Subject  $\Sigma_m$  is a subset of  $\Lambda_m \cap F_m$

Computation Job No. 16-197-15

Computed by 17 Checked by 17 Date 11-20-04

JAMES M. SEMALE COMPANY, LTD 1904, BRENT  
CIVIL and SANITARY Engineers.

## Section 7. *Classification*

Subject: Engineering / Mathematics / Physics / Chemistry / Physics

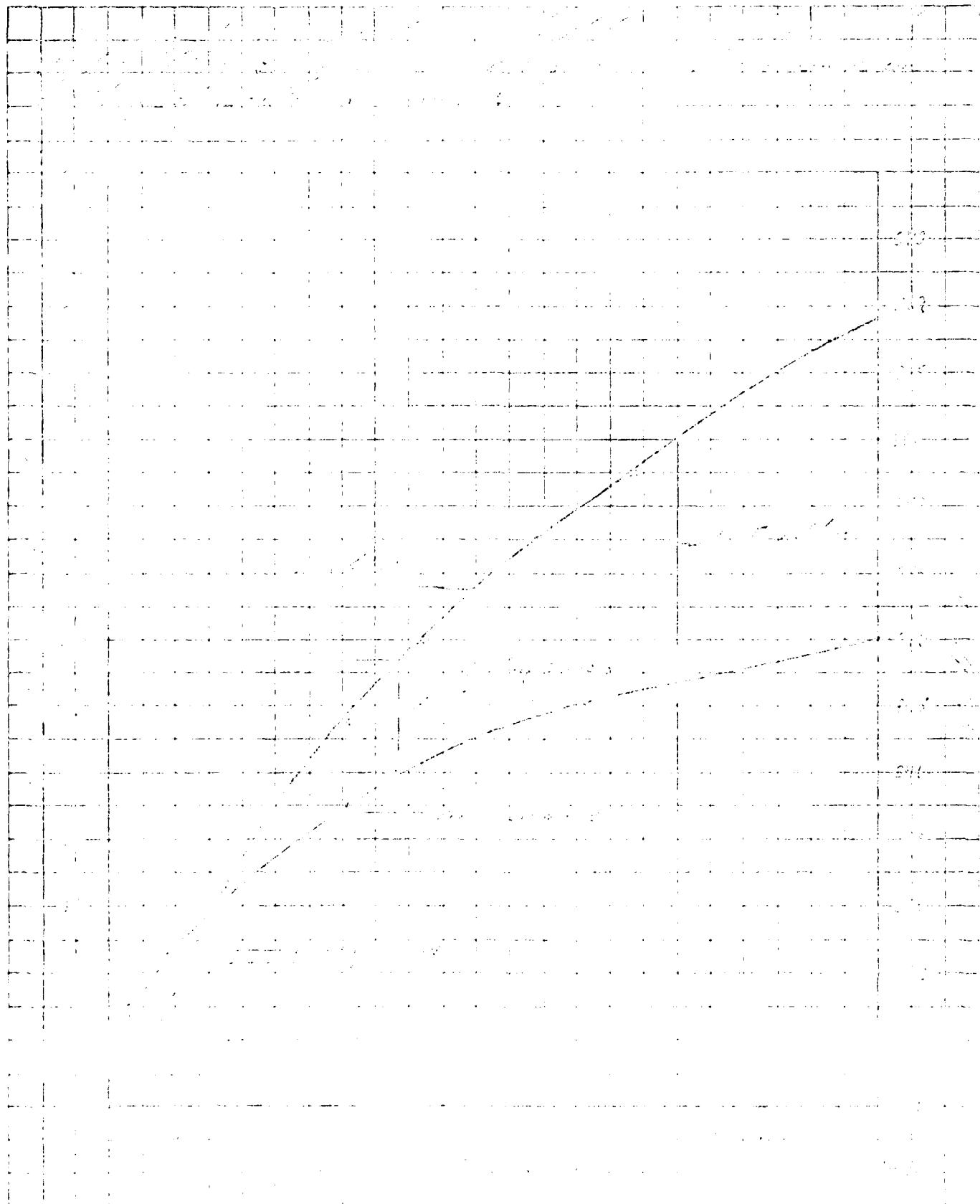
Computation 1 Job No. 1 R

Computed by 300-100 Checked by 000 Date 11-11-19

JAMES W. SEWELL COMPANY, OLD TOWN, MAINE  
Civil and Sanitary Engineers

Sheet 11 of 12

Subject W. 100 ft. x 100 ft. site  
Computation 1/2 in. = 100 ft. Job No. 7-100  
Computed by W. S. S. Checked by W. S. S. Date 10/10/58



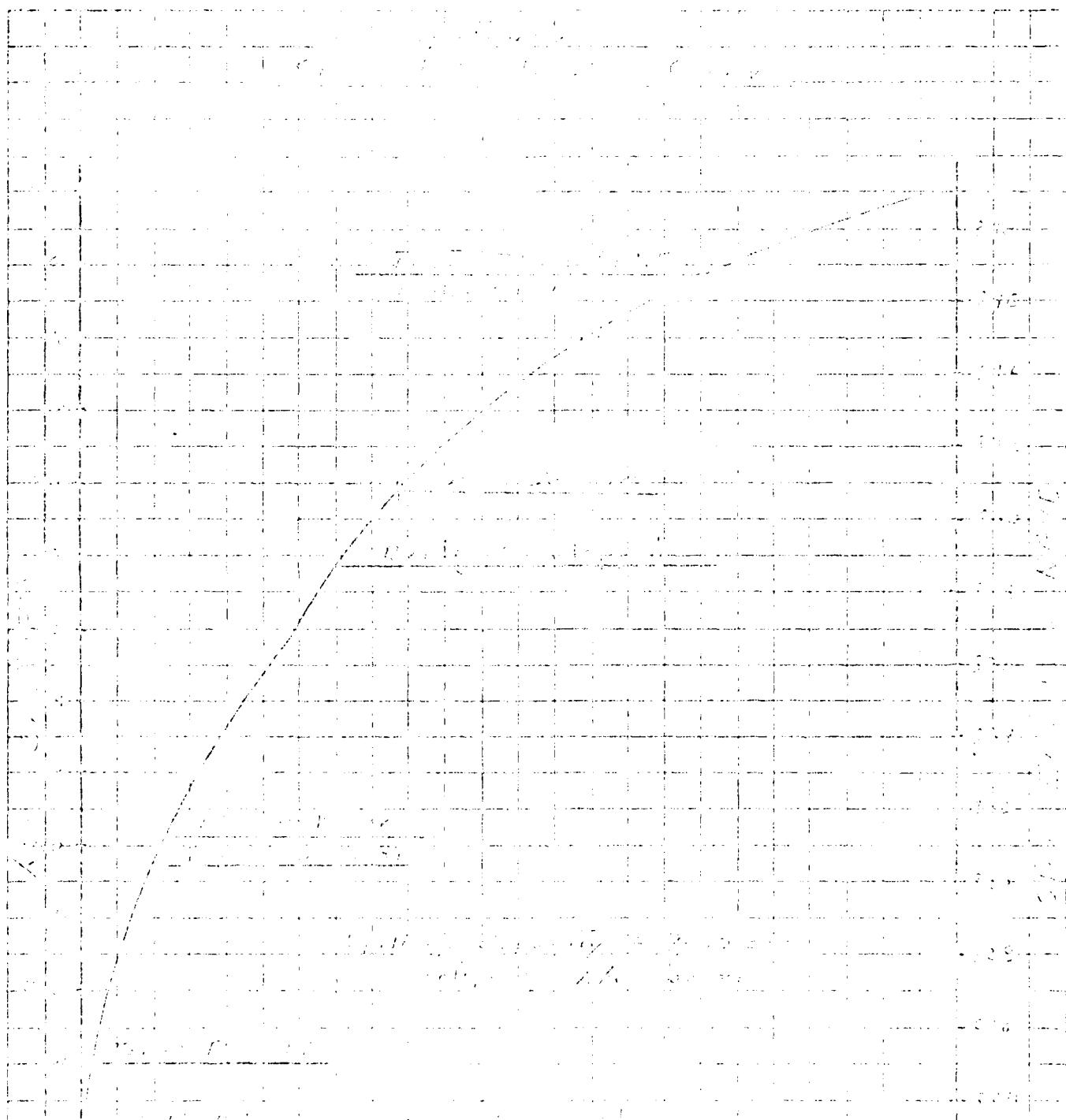
JAMES M. SEWALL COMPANY, LTD. LTD., BOSTON, MASS.  
Civil and Sanitary Engineers.

Sheet 6 of 11

Subject Engineering Drawing of Job No. 111

Computation Scale Drawing Job No. 111

Computed by J. M. S. Checked by J. M. S. Date 11-26-55



JAMES M. SEWELL COMPANY, OLD TOWN, FAIRFIELD  
Civil and Sanitary Engineers.

Sheet 1 of 1

Subject: *Indirect, Inverse, and Mutual Information*

Computation  $\mathcal{S}(b, \gamma, \beta)$  job  $\mathcal{B}_2$   $\in \mathcal{C}(b, \gamma, \beta)$

Computed by 147 Checked by 147 Date 11-20-19

for  $\gamma \geq 15$ . Then it will be shown that the  
above relation holds for all  $\gamma > 0$  by  
the same method as above.

$$L = 6485 - (6 \cdot 8) = 637 = 85 + 67 = 142$$

$b = 12 - 6 = 6$  and  $2 = 2$

1. *U. S. Fish and Game*, 1905, 21, 103-104.

1. *Georgius Agricola* (1516-1555) *De Re Metallica* (1550) *De Natura Rerum* (1546)

1. *What is the name of the author of the book?*

1. *Chlorophytum* *toppani* *var.* *toppani* *W. T. A. B. C. L. K.*

在這裏，我們可以說，這就是我們的「社會主義」。

JAMES W. SETHI, COMPANY, GPO, TORONTO, MARCH  
Civil and Sanitary Engineers

Sheet 1 of 14

Computation of  $\int_{\mathcal{C}} f(z) dz$  using the trapezoidal rule.

Computed by John Doe Checked by John Doe Date 11/11/2023

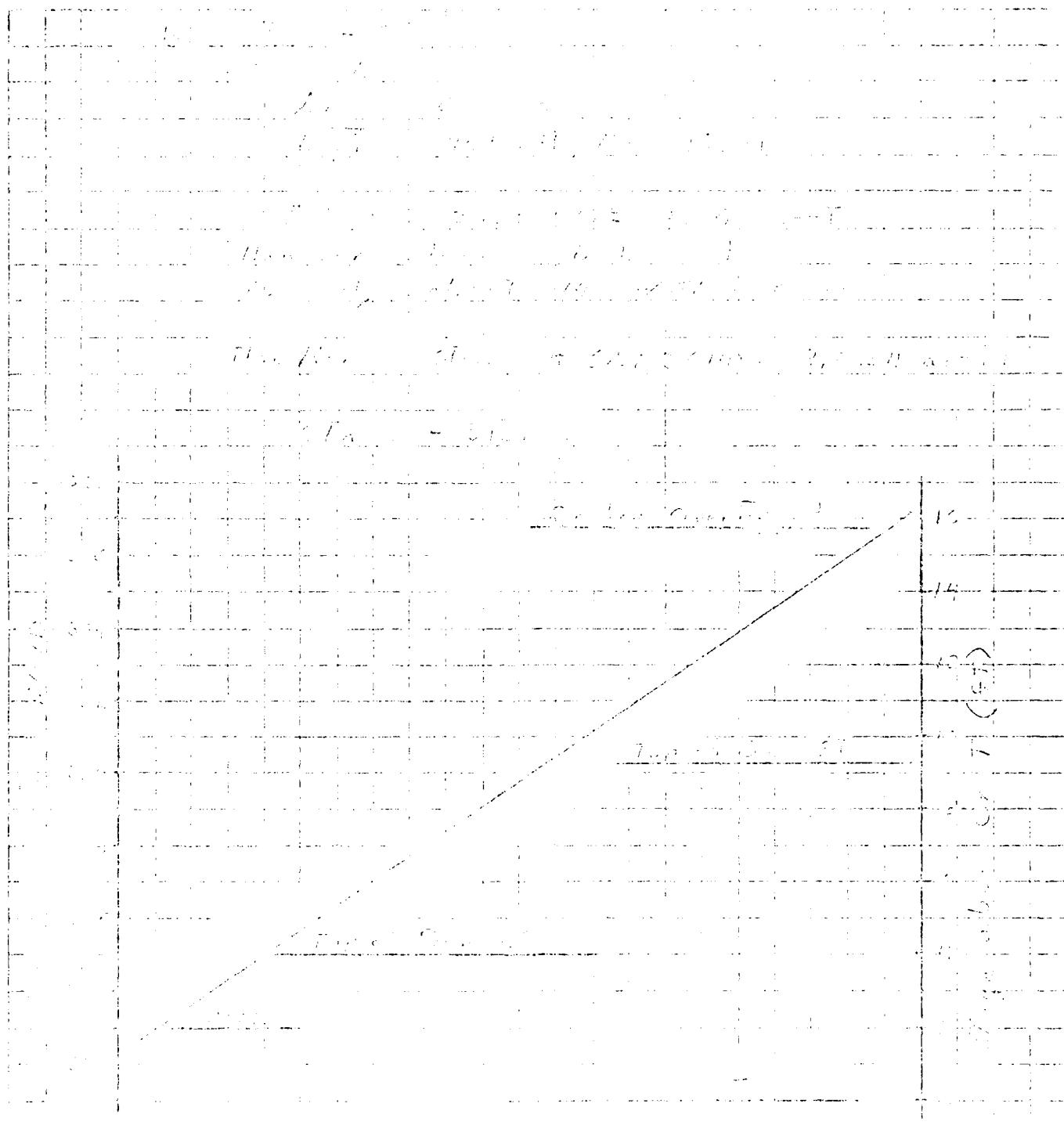
James M. Sargent, C. E. C. M., Civil Engineer  
Civil and Sanitary Engineer

Street \_\_\_\_\_

Subject Design of a Gravity Filter

Computation by hand

Computed by James M. Sargent Checked by James M. Sargent Date 7/1/19



James W. St. John, CIVIL ENGINEER, P.E.  
Civil and Surveyor, Engineer

State of Florida

Subject \_\_\_\_\_

Computation \_\_\_\_\_

Computed by \_\_\_\_\_ Checked by \_\_\_\_\_

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JAMES M. GRIFFITH COMPANY, INC., INC.  
Civil and Sanitary Engineers

1000 N. Dearborn Street

CHICAGO, ILLINOIS 60610

checked by John M. Griffith 10/10/68

1000 N. Dearborn Street  
Chicago, Illinois 60610

JAMES W. SCHWARTZ, C. E. & P., M.D.C.E.  
Civil and Sanitary Engineers

Street: 11th & 1/2

Subject: Job No. 100

Computation: Job No. 100

Computed by: J. W. S. Checked by: J. W. S. Date: 1/15/41

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|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

JAMES M. SEWELL COMPANY, 826 TOWN, BIRMINGHAM  
Civil and Sanitary Engineers

### Structure of $\mathcal{A}$

Completion: 100% of the time

Completion date \_\_\_\_\_ dictated by \_\_\_\_\_ Date \_\_\_\_\_

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE  
Civil and Sanitary Engineers

Sheets 1 of 1

Subject Integration of Functions  
Computation 100 Job No. 100  
Computed by 100 Checked by 100 Date 10-10-10

JAMES M. SELLIER, CIVIL ENGINEER,  
CIVIL and SURVEY, Engineer

Sheet No. 022

Subject \_\_\_\_\_

Computation \_\_\_\_\_ Date 7/1/68

Computed by \_\_\_\_\_ Checked by \_\_\_\_\_ Date 7/1/68

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
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|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|

JAMES W. SEWALL COMPANY, 600 TOWN, BOSTON  
Civil and Sanitary Engineers.

Sheet 1 of 1

Subject \_\_\_\_\_

Computed by System Checked by System Date 11/1/2023

James W. Small Company, CED Division  
Civil and Sanitary Engineering

Sheet No. 1 of 1

Subject

Computation

Computed by

Checked by

Date

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

JAMES W. SCHALL COMPANY, 909 FIFTH AVENUE  
Civil and Sanitary Engineers.

Sheet 1 of 6

Object 1      Input 1      Output 1      Date 1/1/1990  
Inputation 1      Date 1/1/1990  
Inputed by 1      Checked by 1      Date 1/1/1990

PRELIMINARY GUIDANCE  
FOR ESTIMATING  
MAXIMUM PROBABLE DISCHARGES  
IN  
PHASE I DAM SAFETY  
INVESTIGATIONS

New England Division  
Corps of Engineers

March 1978

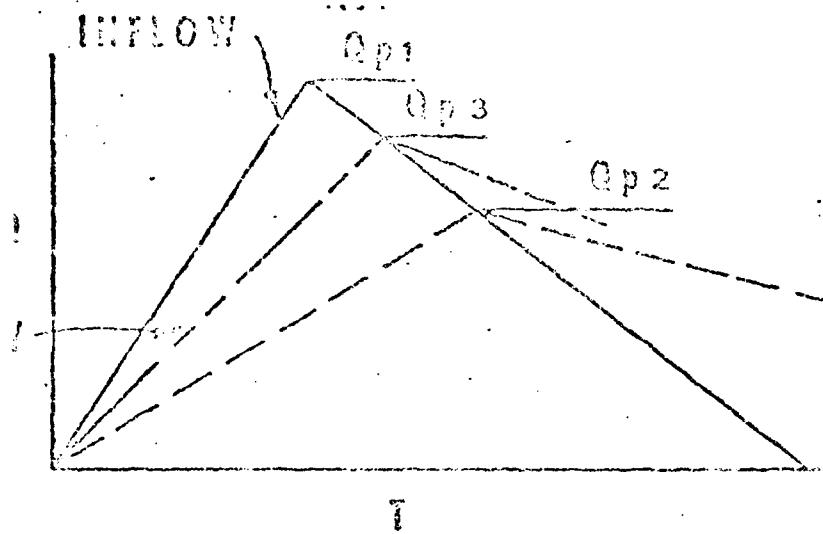
INFLUENCING FLOOD AREAS  
IN THE STATE OF VERMONT

| Project               | C<br>(cu.) | B.A.<br>(sq. mi.) | MPE<br>cfs/sq. mi. |
|-----------------------|------------|-------------------|--------------------|
| 1. Hell Meadow Brook  | 26,600     | 17.2              | 1,546              |
| 2. West Branch        | 15,500     | 9.25              | 1,675              |
| 3. Thetford           | 155,000    | 57.2              | 1,625              |
| 4. Northfield Brook   | 9,000      | 5.7               | 1,580              |
| 5. Black Rock         | 25,000     | 20.4              | 1,715              |
| 6. Hancock Brook      | 20,700     | 12.0              | 1,725              |
| 7. Hop Brook          | 25,400     | 16.4              | 1,610              |
| 8. Tully              | 47,000     | 50.0              | 940                |
| 9. Farre Falls        | 61,000     | 55.0              | 1,109              |
| 10. Conant Brook      | 11,900     | 7.8               | 1,525              |
| 11. Knightville       | 160,000    | 162.0             | 987                |
| 12. Littleville       | 98,000     | 52.3              | 1,870              |
| 13. Colebrook River   | 165,000    | 118.0             | 1,400              |
| 14. Mad River         | 30,000     | 18.2              | 1,350              |
| 15. Sucker Brook      | 6,500      | 3.43              | 1,895              |
| 16. Union Village     | 110,000    | 126.0             | 873                |
| 17. North Hartland    | 199,000    | 220.0             | 904                |
| 18. North Springfield | 157,000    | 158.0             | 994                |
| 19. Ball Mountain     | 190,000    | 172.0             | 1,105              |
| 20. Townshend         | 228,000    | 106.0(278 total)  | 820                |
| 21. Surry Mountain    | 63,000     | 100.0             | 630                |
| 22. Otter Brook       | 45,000     | 47.0              | 957                |
| 23. Birch Hill        | 88,500     | 175.0             | 505                |
| 24. East Brimfield    | 73,900     | 67.5              | 1,095              |
| 25. Westville         | 38,400     | 99.5(32 net)      | 1,200              |
| 26. West Thetford     | 85,600     | 173.5(74 net)     | 1,150              |
| 27. Ledges Village    | 25,600     | 31.1              | 1,145              |
| 28. Buffumsville      | 35,500     | 26.5              | 1,377              |
| 29. Mansfield Hollow  | 125,000    | 139.0             | 786                |
| 30. West Hill         | 26,000     | 26.0              | 928                |
| 31. Franklin Falls    | 210,000    | 1000.0            | 210                |
| 32. Blackwater        | 65,400     | 120.0             | 520                |
| 33. Hopkinton         | 135,000    | 420.0             | 316                |
| 34. Everett           | 61,000     | 64.0              | 1,032              |
| 35. Middlebury        | 45,000     | 74.0              | 625                |

**MAXIMUM FLOW AND FLOWS**  
**FOR 100-YEAR FLOOD**  
**FOR SELECTED RIVERS IN MASSACHUSETTS**  
**(River and Coastal Areas)**

| River                  | Max Flow<br>(cfs) | Area<br>(sq. mi.) | Max<br>(cfs/sq. mi.) |
|------------------------|-------------------|-------------------|----------------------|
| 1. Pawtuxet River      | 19,000            | 200               | 190                  |
| 2. Mill River (R.I.)   | 3,500             | 34                | 500                  |
| 3. Peters River (R.I.) | 3,200             | 13                | 420                  |
| 4. Kettle Brook        | 8,000             | 30                | 530                  |
| 5. Sudbury River.      | 11,700            | 86                | 270                  |
| 6. Indian Brook (R.I.) | 1,000             | 5.9               | 340                  |
| 7. Charles River.      | 6,000             | 184               | 65                   |
| 8. Blackstone River.   | 43,000            | 416               | 200                  |
| 9. Quinebaug River     | 55,000            | 331               | 330                  |

# ESTIMATING EFFECT OF SURCHARGE ON MAXIMUM PROBABLE FLOODFALLS



EP 1: Determine Peak Inflow ( $Q_{p1}$ ) from Guide Curves.

EP 2: a. Determine Surcharge Height To Pass " $Q_{p1}$ ".

b. Determine Volume of Surcharge ( $STOR_1$ ) In Inches of Runoff.

c. Maximum Probable Flood Runoff In NE England equals Approx. 19", Therefore

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR_1}{19}\right)$$

EP 3: a. Determine Surcharge Height and  
"STOR<sub>2</sub>" To Pass " $Q_{p2}$ "

b. Average "STOR<sub>1</sub>" and "STOR<sub>2</sub>" and  
Determining Average "STOR" and  
Resulting Peak Outflow " $Q_{p3}$ ".

DRAINAGE AREA IN SQ. MILES

1000 500 100 50 25 10 5 2 1 0.5 0.25 0.125 0.0625 0.03125 0.015625 0.0078125 0.00390625 0.001953125 0.0009765625 0.00048828125 0.000244140625 0.0001220703125 0.00006103515625 0.000030517578125 0.0000152587890625 0.00000762939453125 0.000003814697265625 0.0000019073486328125 0.00000095367431640625 0.000000476837158203125 0.0000002384185791015625 0.00000012020928955078125 0.000000060104644775390625 0.0000000300523223876953125 0.00000001502616119384765625 0.000000007513080596923828125 0.0000000037565402984619140625 0.00000000187827014923095703125 0.000000000939135074615478515625 0.0000000004695675373077392578125 0.00000000023478376865386962890625 0.000000000117391884326934814453125 0.0000000000586959421634674072265625 0.00000000002934797108173370361328125 0.000000000014673985540866851805640625 0.000000000007336992770433425902828125 0.000000000003668496385216712951415625 0.000000000001834248192608356475703125 0.0000000000009171240963041782378515625 0.00000000000045856204815208911892890625 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AD-A155 796

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS  
SEBEC DAM ME 00163 PE.. (U) CORPS OF ENGINEERS WALTHAM  
MA NEW ENGLAND DIV JUN 81

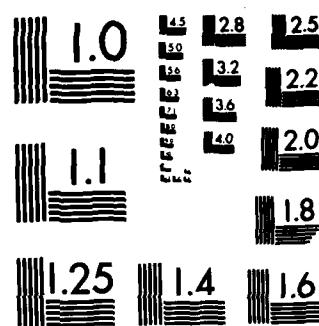
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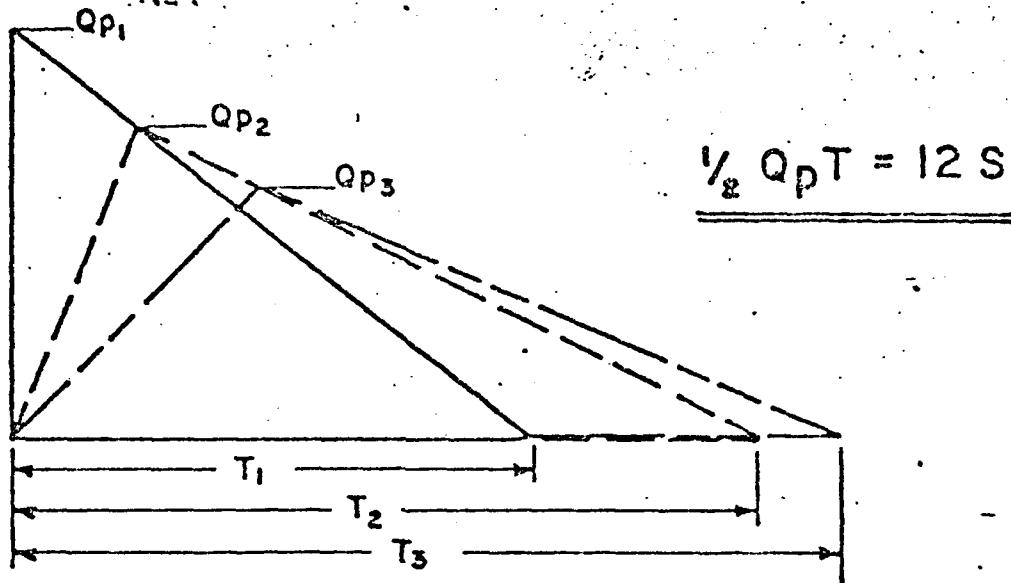
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

# "RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



**STEP 1:** DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.  
**STEP 2:** DETERMINE PEAK FAILURE OUTFLOW ( $Q_{p1}$ ).

$$Q_{p1} = \frac{8}{27} W_b \sqrt{g} Y_0^{3/2}$$

$W_b$  = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

$Y_0$  = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

**STEP 3:** USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

**STEP 4:** ESTIMATE REACH OUTFLOW ( $Q_{p2}$ ) USING FOLLOWING ITERATION.

A. APPLY  $Q_{p1}$  TO STAGE RATING, DETERMINE STAGE AND ACCOMPANYING VOLUME ( $V_1$ ) IN REACH IN AC-FT. (NOTE: IF  $V_1$  EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL  $Q_{p2}$ :

$$Q_{p2}(\text{TRIAL}) = Q_{p1} (1 - \frac{V_1}{S})$$

C. COMPUTE  $V_2$  USING  $Q_{p2}$  (TRIAL).

D. AVERAGE  $V_1$  AND  $V_2$  AND COMPUTE  $Q_{p2}$ .

$$Q_{p2} = Q_{p1} (1 - \frac{V_{avg}}{S})$$

**STEP 5:** FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

APPENDIX E  
INFORMATION AS CONTAINED IN  
THE NATIONAL INVENTORY OF DAMS

**NOT AVAILABLE AT THIS TIME**

**END**

**FILMED**

**8-85**

**DTIC**